

# Work Order ID 150978

Monday, September 12, 2016 8:56:20 AM

**\*150978\***

Item ID: D119-796-141  
Revision ID:

Accept

**\*N900040100\***

Setup Start **\*NS1\***

Item Name: FWD Crossrube Installation without Step (no hardware)

Stop **\*NS2\***

Start Date: 8/19/2016 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 9/15/2016 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals: Process Plan: **21** **DAS**

Date: **SEP 12 2016**

Tooling:

Date:

Run Start

**\*NR1\***

QC: **9-89**

Date: **SEP 12 2016**

SPC (Y/N):

Date:

Stop

**\*NR2\***

Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Tool ID Tool # Plan  
Code

Accept Qty

Reject Qty

Reject Number Insp.  
Stamp

D119-796-141 H

110 Document Control

0.00

**\*110\***

DC

Memo

0.00

Doc Control - USB or Paperwork

Photocopy bluefile and create labels as per PPP D119-796-141 cty 004

*N/A*

120

**\*120\***

Packaging

Packaging

Memo

0.00

Packaging

*16-10-18*

130

**\*130\***

CNC Bend 2

BENDING MACHINE - CROSSTUBES

Memo

0.45

CNC Alpha 160 Bender

Bend tube as per Dwg D119-796-141 using CNC bender program

*16-10-18*



DQA: \_\_\_\_\_ Date: \_\_\_\_\_  
QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

**WORK ORDER NON-CONFORMANCE / UPDATE**

Work Order update only

| Work Order: _____                            |  | DISPOSITION          |  | AGAINST DEPARTMENT/PROCESS |  |               |  |            |  |                       |  |
|----------------------------------------------|--|----------------------|--|----------------------------|--|---------------|--|------------|--|-----------------------|--|
| Part No. _____                               |  | Suspected Unapproved |  | Rework                     |  | Skid-tube     |  | Cross tube |  | Water Jet             |  |
| NCR No. _____                                |  | Use-as-is            |  | Scrap                      |  | Machining     |  | Small Fab  |  | Prod. Eng. Coord.     |  |
| Date: _____                                  |  | Step #: _____        |  | QTY Effective: _____       |  | Thermoforming |  | Finishing  |  | Supplier              |  |
|                                              |  |                      |  |                            |  | Large Fab     |  | Composite  |  | Engineering           |  |
|                                              |  |                      |  |                            |  |               |  |            |  | Quality               |  |
|                                              |  |                      |  |                            |  |               |  |            |  | Other                 |  |
|                                              |  |                      |  |                            |  |               |  |            |  | MRB (QS1042) Approval |  |
| Disposition                                  |  |                      |  |                            |  |               |  |            |  |                       |  |
| Description Work Order Deviation             |  |                      |  |                            |  |               |  |            |  |                       |  |
| Completed By                                 |  |                      |  |                            |  |               |  |            |  |                       |  |
| Lead hand / Supervisor Approval Verification |  |                      |  |                            |  |               |  |            |  |                       |  |
| QC / QA Coordinator Approval                 |  |                      |  |                            |  |               |  |            |  |                       |  |

| FAULT CATEGORY     |                       |                        |                                   |                       |                      |  |  |  |  |  |  |
|--------------------|-----------------------|------------------------|-----------------------------------|-----------------------|----------------------|--|--|--|--|--|--|
| Root Cause         |                       |                        |                                   | Fault Category        |                      |  |  |  |  |  |  |
| Environment        | No Re-verification    | Pressure/Forced        | Temperature/Cure                  | Power Loss/Surge      | Positioned Wrong     |  |  |  |  |  |  |
| Design             | Operator              | Bending                | Set-up                            | Folio/Program         | Outside Dimensions   |  |  |  |  |  |  |
| Doc/Data           | Offset/Setup          | Centre Not Concentric  | BOM/Route                         | Grain                 | Over/Under tolerance |  |  |  |  |  |  |
| Equip/Tooling      | Supplier              | Cracks                 | Broken/Damage/Defect              | Weld                  | Part Incorrect       |  |  |  |  |  |  |
| Handling/Pre       | Training              | Crimp/Kink/Ripple/Wave | Inspection Incomplete/Unqualified | Wrong Stock Pulled    | Part Lost/Missing    |  |  |  |  |  |  |
| Material           | Use for Testing       | Cuffs                  | Contamination                     | Out of Sequence       | Part Moved           |  |  |  |  |  |  |
| Internal Transport | Poor Information      | Crushing               | Countersink                       | Off-set               | Drawing              |  |  |  |  |  |  |
| Tribal Knowledge   | Rushing               | Heat Treat             | Cut Too Short                     | Mislabeled            | Finish               |  |  |  |  |  |  |
| LOA                | Product Improvement   | Wave/Twist in Tube     | Instructions Incomplete/Unclear   | Fit/Function          | Misread              |  |  |  |  |  |  |
| Substation         | Process Improvement   | Marks/Chatter          | Drill Holes                       | Misaligned/off center | Turning Sequence     |  |  |  |  |  |  |
| Past Expiry Date   | Manufacturing Process |                        |                                   |                       |                      |  |  |  |  |  |  |
| Misidentified      | Past Due              |                        |                                   |                       |                      |  |  |  |  |  |  |
|                    |                       |                        |                                   | OTHER :               |                      |  |  |  |  |  |  |

# Work Order ID 150978

Monday, September 12, 2016 8:56:20 AM

\*150978\*

Item ID: D119-796-141  
Revision ID:

Accept

\*N900040100\*

Setup Start

\*N.S1\*

Item Name: FWD Crossstube Installation without Step (no hardware)

Stop

\*N.S2\*

Start Date: 8/19/2016 Start Qty: 1.00

\*1\*

Cust Item ID:

Required Date: 9/15/2016 Req'd Qty: 1.00

\*1\*

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Run Start

\*NR1\*

Stop

\*NR2\*

Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Tool ID Tool #

Plan Code

Accept Qty

Reject Qty

Reject Number Insp. Stamp

140

QC15- Crossstube Dimensional Check

0.00

\*140\*

QC

Memo

0.00

Quality Control

145

\*145\*

Crossstubes

Crossstubes

Memo

0.14

1- CUT TUBE AT HEIGHT ON FAI SHEET

2- VERIFY HEIGHT: 71.62

BY QC15 LEVEL INSPECTOR:

3- DEBURR CUT SURFACE

DR2 16-10-19

1 16/10/19

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

## WORK ORDER NON-CONFORMANCE / UPDATE

Work Order update only

|                                                      |  |                                                                                                                                                                                |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |  |  |                                                        |  |                                              |  |                              |  |
|------------------------------------------------------|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--------------------------------------------------------|--|----------------------------------------------|--|------------------------------|--|
| Work Order: _____<br>Part No. _____<br>NCR No. _____ |  | <b>DISPOSITION</b><br>Rework <input type="checkbox"/><br>Scrap <input type="checkbox"/><br>Use-as-is <input type="checkbox"/><br>Suspected Unapproved <input type="checkbox"/> |  | <b>AGAINST DEPARTMENT/PROCESS</b><br>Skid-tube <input type="checkbox"/><br>Machining <input type="checkbox"/><br>Thermoforming <input type="checkbox"/><br>Large Fab <input type="checkbox"/><br>Cross tube <input type="checkbox"/><br>Small Fab <input type="checkbox"/><br>Finishing <input type="checkbox"/><br>Composite <input type="checkbox"/><br>Water Jet <input type="checkbox"/><br>Prod. Eng. Coord. <input type="checkbox"/><br>Rec/Store/Packaging <input type="checkbox"/><br>Supplier <input type="checkbox"/><br>Engineering <input type="checkbox"/><br>Quality <input type="checkbox"/><br>Other <input type="checkbox"/> |  |  |  | Date : _____<br>Step #: _____<br>QTY Effective : _____ |  | MRB (QSI042) Approval                        |  |                              |  |
| Description Work Order Deviation                     |  |                                                                                                                                                                                |  | Disposition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |  |  | Completed By                                           |  | Lead hand / Supervisor Approval Verification |  | QC / QA Coordinator Approval |  |

| Root Cause         |                       | FAULT CATEGORY         |                                   |                       |                      |  |  |  |  |  |  |
|--------------------|-----------------------|------------------------|-----------------------------------|-----------------------|----------------------|--|--|--|--|--|--|
| Environment        | No Re-verification    | Pressure/Forced        | Temperature/Cure                  | Power Loss/Surge      | Positioned Wrong     |  |  |  |  |  |  |
| Design             | Operator              | Bending                | Set-up                            | Folio/Program         | Outside Dimensions   |  |  |  |  |  |  |
| Doc/Data           | Offset/Setup          | Centre Not Concentric  | BOM/Route                         | Grain                 | Over/Under tolerance |  |  |  |  |  |  |
| Equip/Tooling      | Supplier              | Cracks                 | Broken/Damage/Defect              | Weld                  | Part Incorrect       |  |  |  |  |  |  |
| Handling/Pre       | Training              | Crimp/Kink/Ripple/Wave | Inspection Incomplete/Unqualified | Wrong Stock Pulled    | Part Lost/Missing    |  |  |  |  |  |  |
| Material           | Use for Testing       | Cuffs                  | Contamination                     | Out of Sequence       | Part Moved           |  |  |  |  |  |  |
| Internal Transport | Poor Information      | Crushing               | Countersink                       | Off-set               | Drawing              |  |  |  |  |  |  |
| Tribal Knowledge   | Rushing               | Heat Treat             | Cut Too Short                     | Mislabeled            | Finish               |  |  |  |  |  |  |
| LOA                | Product Improvement   | Wave/Twist in Tube     | Instructions Incomplete/Unclear   | Fit/Function          | Misread              |  |  |  |  |  |  |
| Substation         | Process Improvement   | Marks/Chatter          | Drill Holes                       | Mismatched/off center | Turning Sequence     |  |  |  |  |  |  |
| Past Expiry Date   | Manufacturing Process |                        |                                   |                       |                      |  |  |  |  |  |  |
| Misidentified      | Past Due              |                        |                                   |                       |                      |  |  |  |  |  |  |
|                    |                       | OTHER :                |                                   |                       |                      |  |  |  |  |  |  |

# Work Order ID 150978

Monday, September 12, 2016 8:56:20 AM

\*150978\*

Item ID: D119-796-141

Accept

Revision ID:

\*N900040100\*

Setup Start

\*N.S1\*

Item Name: FWD Crosstube Installation without Stop (no hardware)

Stop

\*N.S2\*

Start Date: 8/19/2016 Start Qty: 1.00

\*1\*

Cust Item ID:

Required Date: 9/15/2016 Req'd Qty: 1.00

\*1\*

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start

\*NR1\*

QC:

Date:

SPC (Y/N):

Date:

Stop

\*NR2\*

Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Tool ID Tool # Plan  
Code

Accept Qty

Reject Qty

Reject Number Insp.  
Stamp

150

\*150\*

Crosstubes

0.00

Memo

0.64

Crosstubes

\*\*\*\*\* ENSURE PROPER JIG POSITIONING \*\*\*\*\*

\*\*\*\*\* ENSURE PROPER JIG POSITIONING \*\*\*\*\*

1-DRILL TUBE AS PER DWG USING DT10087

2-DRILL RIVET HOLES USING DT8787 FWD

3-DEBURR AND CSINK RIVET HOLES AS PER DWG

4-FLIP TUBE, REPEAT STEP 2 AND 3

5-SCRIBE PART# AND BATCH# USING VIBRATING STYLUS ON INSIDE  
OF CUFF AS PER DWG D119-796-141

083 16-10-20

|                                                              |  |                                                                                                                                |  |                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |  |  |
|--------------------------------------------------------------|--|--------------------------------------------------------------------------------------------------------------------------------|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|
| Work Order: _____<br><br>Part No. _____<br><br>NCR No. _____ |  | <b>DISPOSITION</b><br><br><div> <div>Rework</div> <div>Scrap</div> <div>Use-as-is</div> <div>Suspected Unapproved</div> </div> |  | <b>AGAINST DEPARTMENT/PROCESS</b><br><br><div> <div>Skid-tube</div> <div>Machining</div> <div>Thermoforming</div> <div>Large Fab</div> </div> <div> <div>Cross tube</div> <div>Small Fab</div> <div>Finishing</div> <div>Composite</div> </div> <div> <div>Water Jet</div> <div>Prod. Eng. Coord.</div> <div>Rec/Store/Packaging</div> <div>Supplier</div> </div> <div> <div>Engineering</div> <div>Quality</div> <div>Other</div> </div> |  |  |  |
| Date : _____                                                 |  | Step #: _____                                                                                                                  |  | QTY Effective : _____                                                                                                                                                                                                                                                                                                                                                                                                                     |  |  |  |
| Description Work Order Deviation                             |  | Disposition                                                                                                                    |  | MRB (QS1042) Approval                                                                                                                                                                                                                                                                                                                                                                                                                     |  |  |  |
|                                                              |  |                                                                                                                                |  | Completed By                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |  |
|                                                              |  |                                                                                                                                |  | Lead hand / Supervisor<br>Approval Verification                                                                                                                                                                                                                                                                                                                                                                                           |  |  |  |
|                                                              |  |                                                                                                                                |  | QC / QA Coordinator<br>Approval                                                                                                                                                                                                                                                                                                                                                                                                           |  |  |  |

| Root Cause         |                       | FAULT CATEGORY         |                                   |                       |                      |  |  |  |  |  |  |
|--------------------|-----------------------|------------------------|-----------------------------------|-----------------------|----------------------|--|--|--|--|--|--|
| Environment        | No Re-verification    | Pressure/Forced        | Temperature/Cure                  | Power Loss/Surge      | Positioned Wrong     |  |  |  |  |  |  |
| Design             | Operator              | Bending                | Set-up                            | Folio/Program         | Outside Dimensions   |  |  |  |  |  |  |
| Doc/Data           | Offset/Setup          | Centre Not Concentric  | BOM/Route                         | Grain                 | Over/Under tolerance |  |  |  |  |  |  |
| Equip/Tooling      | Supplier              | Cracks                 | Broken/Damage/Defect              | Weld                  | Part Incorrect       |  |  |  |  |  |  |
| Handling/Pre       | Training              | Crimp/Kink/Ripple/Wave | Inspection Incomplete/Unqualified | Wrong Stock Pulled    | Part Lost/Missing    |  |  |  |  |  |  |
| Material           | Use for Testing       | Cuffs                  | Contamination                     | Out of Sequence       | Part Moved           |  |  |  |  |  |  |
| Internal Transport | Poor Information      | Crushing               | Countersink                       | Off-set               | Drawing              |  |  |  |  |  |  |
| Tribal Knowledge   | Rushing               | Heat Treat             | Cut Too Short                     | Mislabeled            | Finish               |  |  |  |  |  |  |
| LOA                | Product Improvement   | Wave/Twist in Tube     | Instructions Incomplete/Unclear   | Fit/Function          | Misread              |  |  |  |  |  |  |
| Substation         | Process Improvement   | Marks/Chatter          | Drill Holes                       | Misaligned/off center | Turning Sequence     |  |  |  |  |  |  |
| Past Expiry Date   | Manufacturing Process |                        |                                   |                       |                      |  |  |  |  |  |  |
| Misidentified      | Past Due              |                        |                                   |                       |                      |  |  |  |  |  |  |
|                    |                       | OTHER :                |                                   |                       |                      |  |  |  |  |  |  |

Work Order ID 150978

Monday, September 12, 2016 8:56:20 AM

\*150978\*

Item ID: D119-796-141

Accept

Revision ID:

\*N900040100\*

Setup Start

\*NS1\*

Item Name: FWD Crosstube Installation without Step (no hardware)

Stop

\*NS2\*

Start Date: 8/19/2016

\*1\*

Cust Item ID:

Required Date: 9/15/2016

\*1\*

Customer:

Reference:

Approvals: Process Plan:

Date:

Tooling:

Date:

Run Start

\*NR1\*

QC:

Date:

SPC (Y/N):

Date:

Stop

\*NR2\*

Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Tool ID

Tool #

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

160

\*160\*

HandFXtube

Memo

0.04

Hand Finishing Cross tubes

1- INSPECT AND REMOVE ALL MARKS FROM TUBE WITHIN LIMITS  
ON DWG D119-796-141

\*\*\*IMMEDIATELY AFTER GRINDING\*\*\*

2- PRESSURE WASH X-TUBE INSIDE AND OUT

3- ALODINE AND ACID ETCH X-TUBE INSIDE AND OUT AS PER QSID05.

4- Verify grinding marks

By: DR

175

\*175\*

QC

Memo

0.00

Quality Control

QC7-Inspect Chemical Conversion Coat

0.00

DR2 16-10-20

DR 16-10-20





# Work Order ID 150978

Monday, September 12, 2016 8:56:20 AM

\*150978\*

Item ID: D119-796-141 Accept \*N900040100\* Setup Start \*NS1\*

Revision ID: FWD Crosstube Installation without Step (no hardware) Stop \*NS2\*

Item Name: 8/19/2016 Start Qty: 1.00 \*1\*

Required Date: 9/15/2016 Req'd Qty: 1.00 \*1\*

Reference: Customer:

Approvals: Process Plan: Date: Tooling: Date: Run Start \*NR1\*

QC: Date: SPC (Y/N): Date: Stop \*NR2\*

| Sequence ID/<br>Work Center ID | Operation<br>Description               | Set Up/<br>Run Hours | Tool ID | Tool # | Plan<br>Code | Accept<br>Qty | Reject<br>Qty | Reject<br>Number | Insp.<br>Stamp |
|--------------------------------|----------------------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|
| 180                            | Outsource process - NDT per OSI038 4.1 | 0.00                 |         |        |              |               |               |                  | DAS 13         |

\*1RN\* Memo 20.00

Outsource process - NDT \*\*\* WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE\*\*\*

Liquid Penetrant Inspection as per OSI 0380r  
Issue P/O: 34018 LPI as per ASTM 1417  
Level 2 Attach copy of NDT results to work order

190 Packaging 0.00

\*1QN\* Memo 0.00

Packaging Ensure copy of NDT results attached to work order.

200 QC- Inspect part completeness to step on W/O 0.00

\*2NN\* Memo 0.00

QC \*\*\* WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE\*\*\*

Inspect for damage & ensure results are as per Dwg D119-796-141

OCT 21 2016

DAS 13 9-89

OCT 21 2016

DAS 13 9-89

OCT 16-10-21

DAS 9 9-89

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

## WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

Work Order update only

|                                                      |                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                   |                                     |                      |                       |  |
|------------------------------------------------------|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-------------------------------------|----------------------|-----------------------|--|
| Work Order: _____<br>Part No. _____<br>NCR No. _____ |                       | <b>DISPOSITION</b><br><div style="display: flex; justify-content: space-between;"> <div>           Suspected Unapproved<br/> <input type="checkbox"/> Rework<br/> <input type="checkbox"/> Scrap<br/> <input type="checkbox"/> Use-as-is         </div> <div>           Skid-tube<br/> <input type="checkbox"/> Machining<br/> <input type="checkbox"/> Thermoforming<br/> <input type="checkbox"/> Large Fab         </div> <div>           Cross tube<br/> <input type="checkbox"/> Small Fab<br/> <input type="checkbox"/> Finishing<br/> <input type="checkbox"/> Composite         </div> <div>           Water Jet<br/> <input type="checkbox"/> Prod. Eng. Coord.<br/> <input type="checkbox"/> Rec/Store/Packaging<br/> <input type="checkbox"/> Supplier         </div> <div>           Engineering<br/> <input type="checkbox"/> Quality<br/> <input type="checkbox"/> Other         </div> </div> |                                   | <b>AGAINST DEPARTMENT/PROCESS</b>   |                      | MRB (QS1042) Approval |  |
| Date: _____ Step #: _____                            |                       | QTY Effective: _____                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                   |                                     |                      |                       |  |
| <b>Description Work Order Deviation</b>              |                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                   | <b>Disposition</b>                  |                      |                       |  |
|                                                      |                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                   |                                     |                      |                       |  |
| <b>Root Cause</b>                                    |                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                   | <b>FAULT CATEGORY</b>               |                      |                       |  |
| Environment                                          | No Re-verification    | Pressure/Forced                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Temperature/Cure                  | Power Loss/Surge                    | Positioned Wrong     |                       |  |
| Design                                               | Operator              | Bending                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Set-up                            | Folio/Program                       | Outside Dimensions   |                       |  |
| Doc/Data                                             | Offset/Setup          | Centre Not Concentric                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | BOM/Route                         | Grain                               | Over/Under tolerance |                       |  |
| Equip/Tooling                                        | Supplier              | Cracks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Broken/Damage/Defect              | Weld                                | Part Incorrect       |                       |  |
| Handling/Pre                                         | Training              | Crimp/Kink/Ripple/Wave                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Inspection Incomplete/Unqualified | Wrong Stock Pulled                  | Part Lost/Missing    |                       |  |
| Material                                             | Use for Testing       | Cuffs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Contamination                     | Out of Sequence                     | Part Moved           |                       |  |
| Internal Transport                                   | Poor Information      | Crushing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Countersink                       | Off-set                             | Drawing              |                       |  |
| Tribal Knowledge                                     | Rushing               | Heat Treat                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Cut Too Short                     | Mislabeled                          | Finish               |                       |  |
| LOA                                                  | Product Improvement   | Wave/Twist in Tube                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Instructions Incomplete/Unclear   | Fit/Function                        | Misread              |                       |  |
| Substation                                           | Process Improvement   | Marks/Chatter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Drill Holes                       | Misaligned/off center               | Turning Sequence     |                       |  |
| Past Expiry Date                                     | Manufacturing Process |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                   |                                     |                      |                       |  |
| Misidentified                                        | Past Due              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                   |                                     |                      |                       |  |
|                                                      |                       | OTHER : _____                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                   |                                     |                      |                       |  |
|                                                      |                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                   |                                     |                      |                       |  |
| <b>Lead hand / Supervisor Approval Verification</b>  |                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                   | <b>QC / QA Coordinator Approval</b> |                      |                       |  |

# Work Order ID 150978

Monday, September 12, 2016 8:56:20 AM

\*150978\*

Item ID: D119-796-141 Accept \*N900040100\* Setup Start \*NS1\*

Revision ID: FWD Crosstube Installation without Step (no hardware) Stop \*NS2\*

Start Date: 8/19/2016 Start Qty: 1.00 \*1\* Cust Item ID:

Required Date: 9/15/2016 Req'd Qty: 1.00 \*1\* Customer:

Reference:

Approvals: Process Plan: Date: Tooling: Date: Run Start \*NR1\*

QC: Date: SPC (Y/N): Date: Stop \*NR2\*

| Sequence ID/<br>Work Center ID | Operation<br>Description | Set Up/<br>Run Hours | Tool ID | Tool # | Plan<br>Code | Accept<br>Qty | Reject<br>Qty | Reject<br>Number | Insp.<br>Stamp |
|--------------------------------|--------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|
|--------------------------------|--------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|

230 SprayPaint

\*220\* Memo 0.06  
\*\*\*VERIFY BY BATCH # TO MATCH W/O

Spray Painting \*\*\*VERIFY BY PART # TO MATCH W/O

\*\*\*MASK SCRIBE B# & P# AND VERIFY\*\*\*

1- Prime inside of tube.

2- Install nut plates as per dwg (D2873-043)

3- Mask cuffs per note#2.

4- Prime exterior of tube per OSI005.

Primer Batch: 135654

Start Time: 11:00

Finish Time: 12:40

24.10.16

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

## WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

Work Order update only

|                                                                           |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |                                                     |  |                                                          |  |
|---------------------------------------------------------------------------|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------------------------------------------|--|----------------------------------------------------------|--|
| <b>Work Order:</b> _____<br><b>Part No.</b> _____<br><b>NCR No.</b> _____ |  | <b>DISPOSITION</b><br><div style="display: flex; justify-content: space-between;"> <div>           Rework <input type="checkbox"/><br/>           Scrap <input type="checkbox"/><br/>           Use-as-is <input type="checkbox"/><br/>           Suspected Unapproved <input type="checkbox"/> </div> <div>           Skid-tube <input type="checkbox"/><br/>           Machining <input type="checkbox"/><br/>           Thermoforming <input type="checkbox"/><br/>           Large Fab <input type="checkbox"/> </div> <div>           Cross tube <input type="checkbox"/><br/>           Small Fab <input type="checkbox"/><br/>           Finishing <input type="checkbox"/><br/>           Composite <input type="checkbox"/> </div> <div>           Water Jet <input type="checkbox"/><br/>           Prod. Eng. Coord. <input type="checkbox"/><br/>           Rec/Store/Packaging <input type="checkbox"/><br/>           Supplier <input type="checkbox"/> </div> <div>           Engineering <input type="checkbox"/><br/>           Quality <input type="checkbox"/><br/>           Other <input type="checkbox"/> </div> </div> |  | <b>AGAINST DEPARTMENT/PROCESS</b>                   |  | <b>MRB (QS1042) Approval</b><br><input type="checkbox"/> |  |
| <b>Date :</b> _____                                                       |  | <b>Step #:</b> _____                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  | <b>QTY Effective :</b> _____                        |  |                                                          |  |
| <b>Description Work Order Deviation</b>                                   |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  | <b>Disposition</b>                                  |  |                                                          |  |
|                                                                           |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |                                                     |  |                                                          |  |
| <b>Completed By</b>                                                       |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  | <b>Lead hand / Supervisor Approval Verification</b> |  |                                                          |  |
| <b>QC / QA Coordinator Approval</b>                                       |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  | <b>QC / QA Coordinator Approval</b>                 |  |                                                          |  |

| Root Cause         |                          | FAULT CATEGORY                   |                          |                                   |                          |                       |                          |                      |                          |  |  |
|--------------------|--------------------------|----------------------------------|--------------------------|-----------------------------------|--------------------------|-----------------------|--------------------------|----------------------|--------------------------|--|--|
| Environment        | <input type="checkbox"/> | Pressure/Forced                  | <input type="checkbox"/> | Temperature/Cure                  | <input type="checkbox"/> | Power Loss/Surge      | <input type="checkbox"/> | Positioned Wrong     | <input type="checkbox"/> |  |  |
| Design             | <input type="checkbox"/> | Bending                          | <input type="checkbox"/> | Set-up                            | <input type="checkbox"/> | Folio/Program         | <input type="checkbox"/> | Outside Dimensions   | <input type="checkbox"/> |  |  |
| Doc/Data           | <input type="checkbox"/> | Centre Not Concentric            | <input type="checkbox"/> | BOM/Route                         | <input type="checkbox"/> | Grain                 | <input type="checkbox"/> | Over/Under tolerance | <input type="checkbox"/> |  |  |
| Equip/Tooling      | <input type="checkbox"/> | Cracks                           | <input type="checkbox"/> | Broken/Damage/Defect              | <input type="checkbox"/> | Weld                  | <input type="checkbox"/> | Part Incorrect       | <input type="checkbox"/> |  |  |
| Handling/Pre       | <input type="checkbox"/> | Crimp/Kink/Ripple/Wave           | <input type="checkbox"/> | Inspection Incomplete/Unqualified | <input type="checkbox"/> | Wrong Stock Pulled    | <input type="checkbox"/> | Part Lost/Missing    | <input type="checkbox"/> |  |  |
| Material           | <input type="checkbox"/> | Cuffs                            | <input type="checkbox"/> | Contamination                     | <input type="checkbox"/> | Out of Sequence       | <input type="checkbox"/> | Part Moved           | <input type="checkbox"/> |  |  |
| Internal Transport | <input type="checkbox"/> | Crushing                         | <input type="checkbox"/> | Countersink                       | <input type="checkbox"/> | Off-set               | <input type="checkbox"/> | Drawing              | <input type="checkbox"/> |  |  |
| Tribal Knowledge   | <input type="checkbox"/> | Heat Treat                       | <input type="checkbox"/> | Cut Too Short                     | <input type="checkbox"/> | Mislabeled            | <input type="checkbox"/> | Finish               | <input type="checkbox"/> |  |  |
| LOA                | <input type="checkbox"/> | Wave/Twist in Tube               | <input type="checkbox"/> | Instructions Incomplete/Unclear   | <input type="checkbox"/> | Fit/Function          | <input type="checkbox"/> | Misread              | <input type="checkbox"/> |  |  |
| Substation         | <input type="checkbox"/> | Marks/Chatter                    | <input type="checkbox"/> | Drill Holes                       | <input type="checkbox"/> | Misaligned/off center | <input type="checkbox"/> | Turning Sequence     | <input type="checkbox"/> |  |  |
| Past Expiry Date   | <input type="checkbox"/> |                                  |                          |                                   |                          |                       |                          |                      |                          |  |  |
| Misidentified      | <input type="checkbox"/> |                                  |                          |                                   |                          |                       |                          |                      |                          |  |  |
|                    |                          | OTHER : <input type="checkbox"/> |                          |                                   |                          |                       |                          |                      |                          |  |  |

Work Order ID 150978

\*150978\*

Monday, September 12, 2016 8:56:20 AM

Item ID: D119-796-141

Accept

Revision ID:

\*N9000040100\*

Setup Start

\*N.S1\*

Item Name: FWD Crosstube Installation without Step (no hardware)

Stop

\*N.S2\*

Start Date: 8/19/2016

\*1\*

Cust Item ID:

Required Date: 9/15/2016

\*1\*

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run

Start

\*NR1\*

QC:

Date:

SPC (Y/N):

Date:

Stop

\*NR2\*

Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Tool ID

Tool #

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

240

QC14- Inspect Spray Paint

0.00

\*240\*

Memo

0.00

QC

\*\*\*VERIFY BY 150178 BATCH # TO MATCH W/O

\*\*\*VERIFY BY 150978 PART # TO MATCH  
W/O 150978

16-10-26

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

## WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

Work Order update only ☐

|                                                                             |  |                                                                                                                                                                                                                                                                               |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |                                                                                                         |  |
|-----------------------------------------------------------------------------|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|---------------------------------------------------------------------------------------------------------|--|
| <b>Work Order:</b> _____<br><b>Part No.:</b> _____<br><b>NCR No.:</b> _____ |  | <b>DISPOSITION</b><br><div style="display: flex; justify-content: space-between;"> <div> Rework <input type="checkbox"/><br/> Scrap <input type="checkbox"/><br/> Use-as-is <input type="checkbox"/> </div> <div> Suspected Unapproved <input type="checkbox"/> </div> </div> |  | <b>AGAINST DEPARTMENT/PROCESS</b><br><div style="display: flex; justify-content: space-between;"> <div> Skid-tube <input type="checkbox"/><br/> Machining <input type="checkbox"/><br/> Thermoforming <input type="checkbox"/><br/> Large Fab <input type="checkbox"/> </div> <div> Cross tube <input type="checkbox"/><br/> Small Fab <input type="checkbox"/><br/> Finishing <input type="checkbox"/><br/> Composite <input type="checkbox"/> </div> <div> Water Jet <input type="checkbox"/><br/> Prod. Eng. Coord. <input type="checkbox"/><br/> Rec/Store/Packaging <input type="checkbox"/><br/> Supplier <input type="checkbox"/> </div> <div> Engineering <input type="checkbox"/><br/> Quality <input type="checkbox"/><br/> Other <input type="checkbox"/> </div> </div> |  |                                                                                                         |  |
| <b>Date :</b> _____                                                         |  | <b>Step #:</b> _____                                                                                                                                                                                                                                                          |  | <b>QTY Effective :</b> _____                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  | <b>MRB (QS1042) Approval</b><br><div style="border: 1px solid black; height: 40px; width: 100%;"></div> |  |
| <b>Description Work Order Deviation</b>                                     |  |                                                                                                                                                                                                                                                                               |  | <b>Disposition</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |                                                                                                         |  |
| <b>Completed By</b>                                                         |  |                                                                                                                                                                                                                                                                               |  | <b>Lead hand / Supervisor Approval Verification</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |                                                                                                         |  |
| <b>QC / QA Coordinator Approval</b>                                         |  |                                                                                                                                                                                                                                                                               |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |                                                                                                         |  |

| FAULT CATEGORY     |                    |          |                        |          |                                   |                 |                       |         |                      |                     |                       |          |
|--------------------|--------------------|----------|------------------------|----------|-----------------------------------|-----------------|-----------------------|---------|----------------------|---------------------|-----------------------|----------|
| Root Cause         |                    |          | Fault Category         |          |                                   |                 |                       |         |                      |                     |                       |          |
| Environment        | No Re-verification | Operator | Offset/Setup           | Supplier | Training                          | Use for Testing | Poor Information      | Rushing | Product Improvement  | Process Improvement | Manufacturing Process | Past Due |
| Design             |                    |          |                        |          |                                   |                 |                       |         |                      |                     |                       |          |
| Doc/Data           |                    |          |                        |          |                                   |                 |                       |         |                      |                     |                       |          |
| Equip/Tooling      |                    |          |                        |          |                                   |                 |                       |         |                      |                     |                       |          |
| Handling/Pre       |                    |          |                        |          |                                   |                 |                       |         |                      |                     |                       |          |
| Material           |                    |          |                        |          |                                   |                 |                       |         |                      |                     |                       |          |
| Internal Transport |                    |          |                        |          |                                   |                 |                       |         |                      |                     |                       |          |
| Tribal Knowledge   |                    |          |                        |          |                                   |                 |                       |         |                      |                     |                       |          |
| LOA                |                    |          |                        |          |                                   |                 |                       |         |                      |                     |                       |          |
| Substation         |                    |          |                        |          |                                   |                 |                       |         |                      |                     |                       |          |
| Past Expiry Date   |                    |          |                        |          |                                   |                 |                       |         |                      |                     |                       |          |
| Misidentified      |                    |          |                        |          |                                   |                 |                       |         |                      |                     |                       |          |
|                    |                    |          | Pressure/Forced        |          | Temperature/Cure                  |                 | Power Loss/Surge      |         | Positioned Wrong     |                     |                       |          |
|                    |                    |          | Bending                |          | Set-up                            |                 | Folio/Program         |         | Outside Dimensions   |                     |                       |          |
|                    |                    |          | Centre Not Concentric  |          | BOM/Route                         |                 | Grain                 |         | Over/Under tolerance |                     |                       |          |
|                    |                    |          | Cracks                 |          | Broken/Damage/Defect              |                 | Weld                  |         | Part Incorrect       |                     |                       |          |
|                    |                    |          | Crimp/Kink/Ripple/Wave |          | Inspection Incomplete/Unqualified |                 | Wrong Stock Pulled    |         | Part Lost/Missing    |                     |                       |          |
|                    |                    |          | Cuffs                  |          | Contamination                     |                 | Out of Sequence       |         | Part Moved           |                     |                       |          |
|                    |                    |          | Crushing               |          | Countersink                       |                 | Off-set               |         | Drawing              |                     |                       |          |
|                    |                    |          | Heat Treat             |          | Cut Too Short                     |                 | Mislabeled            |         | Finish               |                     |                       |          |
|                    |                    |          | Wave/Twist in Tube     |          | Instructions Incomplete/Unclear   |                 | Fit/Function          |         | Misread              |                     |                       |          |
|                    |                    |          | Marks/Chatter          |          | Drill Holes                       |                 | Misaligned/off center |         | Turning Sequence     |                     |                       |          |
|                    |                    |          | OTHER : _____          |          |                                   |                 |                       |         |                      |                     |                       |          |

# Work Order ID 150978

Monday, September 12, 2016 8:56:20 AM

\*150978\*

Item ID: D119-796-141 Accept \*N900040100\* Setup Start \*NS1\*

Revision ID: FWD Crosscube Installation without Step (no hardware) Stop \*NS2\*

Item Name: Start Date: 8/19/2016 Start Qty: 1.00 \*1\*

Required Date: 9/15/2016 Req'd Qty: 1.00 \*1\*

Reference: Cust Item ID: Customer:

Approvals: Process Plan: Date: Tooling: Date: Run Start \*NR1\*

QC: Date: SPC (Y/N): Date: Stop \*NR2\*

| Sequence ID/<br>Work Center ID | Operation<br>Description | Set Up/<br>Run Hours | Tool ID | Tool # | Plan<br>Code | Accept<br>Qty | Reject<br>Qty | Reject<br>Number | Insp.<br>Stamp |
|--------------------------------|--------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|
| 242                            |                          | 0.00                 |         |        |              |               |               |                  |                |

\*242\*

Crosscubes

Memo 0.18

Assemble as per dwg D119-796-141 and Qsi 015

1- Abrade mating surfaces with Scotch Brite 7447 and clean with Dupont 4105s or equivalent as per dwg.

2- Install D5152-041 with proseal 890 on concave surface, 0.100" MIN thick as per dwg using DT10089 (identified righ and left)

\*\*\*MAINTAIN CLAMPING PRESSURE ON FOR MIN 72HRS\*\*\*\*

Proseal Batch: 135390

EXP: 12/16

PROSEAL CURE TIME 72 HOURS:

Start: 16-10-26

Finish: 16-10-29

3- Install support and shim using proseal 890 per dwg and clamp in position.

Proseal Batch: 135390

EXP: 12/16

PROSEAL CURE TIME 72 HOURS:

Start: 27-10-16

Finish: 30-10-16

27-10-16

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

# WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

Work Order update only

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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| <b>Work Order:</b> _____<br><b>Part No.</b> _____<br><b>NCR No.</b> _____                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  | <b>DISPOSITION</b><br>Rework <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Scrap <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Use-as-is <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Suspected Unapproved <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  | <b>AGAINST DEPARTMENT/PROCESS</b><br>Cross tube <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Small Fab <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Finishing <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Composite <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  | Water Jet <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Prod. Eng. Coord. <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Rec/Store/Packaging <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Supplier <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  | Engineering <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Quality <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Other <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  | <b>MRB (QS1042) Approval</b><br>_____                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |
| <b>Date :</b> _____                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    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| <b>Description Work Order Deviation</b><br>_____                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       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                                                                                                                                                                                                                                                                                     |  | <b>Lead hand / Supervisor Approval Verification</b><br>_____                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   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| <b>Root Cause</b><br>Environment <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Design <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Doc/Data <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Equip/Tooling <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Handling/Pre <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Material <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Internal Transport <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Tribal Knowledge <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>LOA <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Substation <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Past Expiry Date <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Misidentified <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |  | No Re-verification <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Operator <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Offset/Setup <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Supplier <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Training <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Use for Testing <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Poor Information <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Rushing <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Product Improvement <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Process Improvement <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Manufacturing Process <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Past Due <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |  | Pressure/Forced <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Bending <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Centre Not Concentric <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Cracks <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Crimp/Kink/Ripple/Wave <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Cuffs <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Crushing <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Heat Treat <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Wave/Twist in Tube <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Marks/Chatter <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |  | Temperature/Cure <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Set-up <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>BOM/Route <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Broken/Damage/Defect <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Inspection Incomplete/Unqualified <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Contamination <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Countersink <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Cut Too Short <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Instructions Incomplete/Unclear <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Drill Holes <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |  | Power Loss/Surge <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Folio/Program <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Grain <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Weld <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Wrong Stock Pulled <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Out of Sequence <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Off-set <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Mislabeled <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Fit/Function <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Misaligned/off center <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |  | Positioned Wrong <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Outside Dimensions <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Over/Under tolerance <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Part Incorrect <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Part Lost/Missing <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Part Moved <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Drawing <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Finish <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Misread <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/><br>Turning Sequence <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |  |
| <b>OTHER :</b> _____                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  | _____                                                                                                                                                                                                                                                                                                  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                                                                                                              |  |



# Work Order ID 150978

Monday, September 12, 2016 8:56:20 AM

\*150978\*

Item ID: D119-796-141 Accept \*N900040100\* Setup Start \*NS1\*

Revision ID: FWD Crosscube Installation without Step (no hardware) Stop \*NS2\*

Start Date: 8/19/2016 Start Qty: 1.00 \*1\*

Required Date: 9/15/2016 Req'd Qty: 1.00 \*1\*

Reference: Cust Item ID: Customer:

Approvals: Process Plan: Date: Tooling: Date: Run Start \*NR1\*

QC: Date: SPC (Y/N): Date: Stop \*NR2\*

| Sequence ID/<br>Work Center ID | Operation<br>Description                      | Set Up/<br>Run Hours | Tool ID | Tool # | Plan<br>Code | Accept<br>Qty | Reject<br>Qty | Reject<br>Number | Insp.<br>Stamp |
|--------------------------------|-----------------------------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|
| 244                            | QC5- Inspect part completeness to step on W/O | 0.00                 |         |        |              |               |               |                  | 38<br>9-89     |

\*244\* Memo \*\*\*VERIFY BY 150978004 BATCH # TO MATCH W/O

QC \*\*\*VERIFY BY 150978004 PART # TO MATCH W/O 150978004

OCT 31 2016

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| QA Closed: _____ Date: _____                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  | Work Order update only _____                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |
| Work Order: _____<br>Part No. _____<br>NCR No. _____                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  | <b>AGAINST DEPARTMENT/PROCESS</b><br><div> <div> Skid-tube<br/>Machining<br/>Thermoforming<br/>Large Fab </div> <div> Cross tube<br/>Small Fab<br/>Finishing<br/>Composite </div> <div> Water Jet<br/>Prod. Eng. Coord.<br/>Rec/Store/Packaging<br/>Supplier </div> <div> Engineering<br/>Quality<br/>Other </div> </div>                                                                                                                                                                                                                                                                          |  |
| Date : _____ Step #: _____                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  | QTY Effective : _____                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |
| Description Work Order Deviation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  | Disposition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  | Completed By _____                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  | Lead hand / Supervisor Approval Verification _____                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  | QC / QA Coordinator Approval _____                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |
| <b>Root Cause</b><br><div> <div>Environment</div> <div>Design</div> <div>Doc/Data</div> <div>Equip/Tooling</div> <div>Handling/Pre</div> <div>Material</div> <div>Internal Transport</div> <div>Tribal Knowledge</div> <div>LOA</div> <div>Substation</div> <div>Past Expiry Date</div> <div>Misidentified</div> </div> <div> <div>No Re-verification</div> <div>Operator</div> <div>Offset/Setup</div> <div>Supplier</div> <div>Training</div> <div>Use for Testing</div> <div>Poor Information</div> <div>Rushing</div> <div>Product Improvement</div> <div>Process Improvement</div> <div>Manufacturing Process</div> <div>Past Due</div> </div> |  | <b>FAULT CATEGORY</b><br><div> <div>Temperature/Cure</div> <div>Set-up</div> <div>BOM/Route</div> <div>Broken/Damage/Defect</div> <div>Inspection Incomplete/Unqualified</div> <div>Contamination</div> <div>Countersink</div> <div>Cut Too Short</div> <div>Instructions Incomplete/Unclear</div> <div>Drill Holes</div> </div> <div> <div>Pressure/Forced</div> <div>Bending</div> <div>Centre Not Concentric</div> <div>Cracks</div> <div>Crimp/Kink/Ripple/Wave</div> <div>Cuffs</div> <div>Crushing</div> <div>Heat Treat</div> <div>Wave/Twist in Tube</div> <div>Marks/Chatter</div> </div> |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  | <div> <div>Positioned Wrong</div> <div>Outside Dimensions</div> <div>Over/Under tolerance</div> <div>Part Incorrect</div> <div>Part Lost/Missing</div> <div>Part Moved</div> <div>Drawing</div> <div>Finish</div> <div>Misread</div> <div>Turning Sequence</div> </div>                                                                                                                                                                                                                                                                                                                            |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  | OTHER : _____                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |

# Work Order ID 150978

Monday, September 12, 2016 8:56:20 AM

\*150978\*

Item ID: D119-796-141

Accept

Revision ID:

\*N900040100\*

Setup Start

\*N.S1\*

Item Name: FWD Crosstube Installation without Step (no hardware)

Stop

\*N.S2\*

Start Date: 8/19/2016 Start Qty: 1.00

\*1\*

Cust Item ID:

Required Date: 9/15/2016 Req'd Qty: 1.00

\*1\*

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Run Start

\*NR1\*

Stop

\*NR2\*

Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Tool ID

Tool #

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

246 Spray Painting per QSI005 4.2 0.00

\*246\*

SprayPaint

Memo

0.05

\*\*\*VERIFY BY DAS BATCH # TO MATCH W/O

\*\*\*VERIFY BY 41 PART # TO MATCH  
W/O 150978 880

\*\*\*MASK SCRIBE B# & P# AND VERIFY\*\*\*

1- Remove all non-fixed hardware and clean any excess proseal.

2- Scuff tube with Scotch Brite 7447.

3- Mask cuff per note#2.

4- Prime as per dwg and QSI005

Primer Batch: 135654 41 16-11-1 DAS

Start Time: 10:00 9:00

Finish Time: 10:30

5- Apply matte clear as per dwg and QSI005

Clear Batch: 135516

Start Time: 14:30

Finish Time: 2:00

1-11-16

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

## WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: \_\_\_\_\_

Date: \_\_\_\_\_

Work Order update only



|                                  |               |                                                                                                                                                                                                                                                                                                                    |  |
|----------------------------------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Work Order: _____                |               | AGAINST DEPARTMENT/PROCESS                                                                                                                                                                                                                                                                                         |  |
| Part No. _____                   |               | Cross tube <input type="checkbox"/> Water Jet <input type="checkbox"/><br>Small Fab <input type="checkbox"/> Prod. Eng. Coord. <input type="checkbox"/><br>Finishing <input type="checkbox"/> Rec/Store/Packaging <input type="checkbox"/><br>Composite <input type="checkbox"/> Supplier <input type="checkbox"/> |  |
| NCR No. _____                    |               | Skid-tube <input type="checkbox"/> Engineering <input type="checkbox"/><br>Machining <input type="checkbox"/> Quality <input type="checkbox"/><br>Thermoforming <input type="checkbox"/> Other <input type="checkbox"/><br>Large Fab <input type="checkbox"/>                                                      |  |
| Date: _____                      | Step #: _____ | QTY Effective: _____                                                                                                                                                                                                                                                                                               |  |
| Description Work Order Deviation |               | MRB (QS1042) Approval                                                                                                                                                                                                                                                                                              |  |
| Disposition                      |               | Completed By                                                                                                                                                                                                                                                                                                       |  |
|                                  |               | Lead hand / Supervisor Approval Verification                                                                                                                                                                                                                                                                       |  |
|                                  |               | QC / QA Coordinator Approval                                                                                                                                                                                                                                                                                       |  |

| Root Cause         |                       | FAULT CATEGORY                    |                      |
|--------------------|-----------------------|-----------------------------------|----------------------|
| Environment        | No Re-verification    | Temperature/Cure                  | Positioned Wrong     |
| Design             | Operator              | Set-up                            | Outside Dimensions   |
| Doc/Data           | Offset/Setup          | BOM/Route                         | Over/Under tolerance |
| Equip/Tooling      | Supplier              | Broken/Damage/Defect              | Part Incorrect       |
| Handling/Pre       | Training              | Inspection Incomplete/Unqualified | Part Lost/Missing    |
| Material           | Use for Testing       | Contamination                     | Part Moved           |
| Internal Transport | Poor Information      | Countersink                       | Drawing              |
| Tribal Knowledge   | Rushing               | Cut Too Short                     | Finish               |
| LOA                | Product Improvement   | Instructions Incomplete/Unclear   | Misread              |
| Substation         | Process Improvement   | Drill Holes                       | Turning Sequence     |
| Past Expiry Date   | Manufacturing Process |                                   |                      |
| Misidentified      | Past Due              |                                   |                      |
| OTHER: _____       |                       |                                   |                      |

Monday, September 12, 2016 8:56:20 AM

**\*150978\***

Page 11

**Accept**

**\*N9nnn4n1nn\***

**Setup Start \*NST\***

**Stop**  
**\*NSC\***

**Cost Item ID:**

## Customer:

**Approvals:** **Process Plan:**

**Date:** \_\_\_\_\_ **Tooling:** \_\_\_\_\_

**Date:**

Run Start

**\*ZBT\***

**QC:** \_\_\_\_\_

**Date:** \_\_\_\_\_ **SPC (Y/N):** \_\_\_\_\_

**Date:**

**Stop**

**\*NR\***

| Operation | Description |
|-----------|-------------|
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| 100       | ...         |

**Set Up/  
Run Hours**

| Tool ID | Tool # |
|---------|--------|
|---------|--------|

| Plan | Code |
|------|------|
|------|------|

**Accept**  
**Only**

Reject  
Only

| Reject | Insp. |
|--------|-------|
|--------|-------|

248 **Spray Painting der OSI005 4.2**

**\*248\***  
**Spray Paint**

## Spray Painting

## Memo

00:00

\*\*\***VERIFY BY**

BATCH # TO MATCH W/O

\*\*\*VERIFY BY DTM PART # TO MATCH  
W/O

# MASK Scribe B# & P# AND VERIFY

1- Mask underside of tube as per dwg. Mask cuff per note#2.

## 2- Scuff tube with Scotch Brite 7447

### 3- Paint outside of crosstube

Paint Batch: 135302

135302

Start Time: 7h15

**Finish Time: 8h30**

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

## WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

Work Order update only



| Work Order: _____<br>Part No. _____<br>NCR No. _____ |        | DISPOSITION   |               | AGAINST DEPARTMENT/PROCESS |          |                       |                  |               |            |                  |               |                     |          |                                              |          |          |                 |                  |         |                     |                     |                       |          |                 |         |                       |        |                        |       |          |            |                    |               |                  |        |           |                      |                                   |               |             |               |                                 |             |                  |               |       |      |                    |                 |         |            |              |                       |                  |                    |                      |                |                   |            |         |        |         |                  |
|------------------------------------------------------|--------|---------------|---------------|----------------------------|----------|-----------------------|------------------|---------------|------------|------------------|---------------|---------------------|----------|----------------------------------------------|----------|----------|-----------------|------------------|---------|---------------------|---------------------|-----------------------|----------|-----------------|---------|-----------------------|--------|------------------------|-------|----------|------------|--------------------|---------------|------------------|--------|-----------|----------------------|-----------------------------------|---------------|-------------|---------------|---------------------------------|-------------|------------------|---------------|-------|------|--------------------|-----------------|---------|------------|--------------|-----------------------|------------------|--------------------|----------------------|----------------|-------------------|------------|---------|--------|---------|------------------|
| Date : _____                                         |        | Step #: _____ |               | Suspected Unapproved       |          | Rework                |                  | Skid-tube     |            | Cross tube       |               | Water Jet           |          | Engineering                                  |          |          |                 |                  |         |                     |                     |                       |          |                 |         |                       |        |                        |       |          |            |                    |               |                  |        |           |                      |                                   |               |             |               |                                 |             |                  |               |       |      |                    |                 |         |            |              |                       |                  |                    |                      |                |                   |            |         |        |         |                  |
|                                                      |        |               |               | Use-as-is                  |          | Scrap                 |                  | Machining     |            | Small Fab        |               | Prod. Eng. Coord.   |          | Quality                                      |          |          |                 |                  |         |                     |                     |                       |          |                 |         |                       |        |                        |       |          |            |                    |               |                  |        |           |                      |                                   |               |             |               |                                 |             |                  |               |       |      |                    |                 |         |            |              |                       |                  |                    |                      |                |                   |            |         |        |         |                  |
|                                                      |        |               |               | Unapproved                 |          |                       |                  | Thermoforming |            | Finishing        |               | Rec/Store/Packaging |          | Other                                        |          |          |                 |                  |         |                     |                     |                       |          |                 |         |                       |        |                        |       |          |            |                    |               |                  |        |           |                      |                                   |               |             |               |                                 |             |                  |               |       |      |                    |                 |         |            |              |                       |                  |                    |                      |                |                   |            |         |        |         |                  |
|                                                      |        |               |               |                            |          |                       |                  | Large Fab     |            | Composite        |               | Supplier            |          |                                              |          |          |                 |                  |         |                     |                     |                       |          |                 |         |                       |        |                        |       |          |            |                    |               |                  |        |           |                      |                                   |               |             |               |                                 |             |                  |               |       |      |                    |                 |         |            |              |                       |                  |                    |                      |                |                   |            |         |        |         |                  |
| Date : _____                                         |        | Step #: _____ |               | QTY Effective : _____      |          | MRB (QS1042) Approval |                  |               |            |                  |               |                     |          |                                              |          |          |                 |                  |         |                     |                     |                       |          |                 |         |                       |        |                        |       |          |            |                    |               |                  |        |           |                      |                                   |               |             |               |                                 |             |                  |               |       |      |                    |                 |         |            |              |                       |                  |                    |                      |                |                   |            |         |        |         |                  |
| Description Work Order Deviation                     |        |               |               |                            |          |                       |                  |               |            |                  |               |                     |          | Disposition                                  |          |          |                 |                  |         |                     |                     |                       |          |                 |         |                       |        |                        |       |          |            |                    |               |                  |        |           |                      |                                   |               |             |               |                                 |             |                  |               |       |      |                    |                 |         |            |              |                       |                  |                    |                      |                |                   |            |         |        |         |                  |
|                                                      |        |               |               |                            |          |                       |                  |               |            |                  |               |                     |          | Completed By                                 |          |          |                 |                  |         |                     |                     |                       |          |                 |         |                       |        |                        |       |          |            |                    |               |                  |        |           |                      |                                   |               |             |               |                                 |             |                  |               |       |      |                    |                 |         |            |              |                       |                  |                    |                      |                |                   |            |         |        |         |                  |
|                                                      |        |               |               |                            |          |                       |                  |               |            |                  |               |                     |          | Lead hand / Supervisor Approval Verification |          |          |                 |                  |         |                     |                     |                       |          |                 |         |                       |        |                        |       |          |            |                    |               |                  |        |           |                      |                                   |               |             |               |                                 |             |                  |               |       |      |                    |                 |         |            |              |                       |                  |                    |                      |                |                   |            |         |        |         |                  |
|                                                      |        |               |               |                            |          |                       |                  |               |            |                  |               |                     |          | QC / QA Coordinator Approval                 |          |          |                 |                  |         |                     |                     |                       |          |                 |         |                       |        |                        |       |          |            |                    |               |                  |        |           |                      |                                   |               |             |               |                                 |             |                  |               |       |      |                    |                 |         |            |              |                       |                  |                    |                      |                |                   |            |         |        |         |                  |
| Root Cause                                           |        |               |               |                            |          |                       |                  |               |            |                  |               |                     |          | FAULT CATEGORY                               |          |          |                 |                  |         |                     |                     |                       |          |                 |         |                       |        |                        |       |          |            |                    |               |                  |        |           |                      |                                   |               |             |               |                                 |             |                  |               |       |      |                    |                 |         |            |              |                       |                  |                    |                      |                |                   |            |         |        |         |                  |
| Environment                                          | Design | Doc/Data      | Equip/Tooling | Handling/Pre               | Material | Internal Transport    | Tribal Knowledge | LOA           | Substation | Past Expiry Date | Misidentified | No re-verification  | Operator | Offset/Setup                                 | Supplier | Training | Use for Testing | Poor Information | Rushing | Product Improvement | Process Improvement | Manufacturing Process | Past Due | Pressure/Forced | Bending | Centre Not Concentric | Cracks | Crimp/Kink/Ripple/Wave | Cuffs | Crushing | Heat Treat | Wave/Twist in Tube | Marks/Chatter | Temperature/Cure | Set-up | BOM/Route | Broken/Damage/Defect | Inspection Incomplete/Unqualified | Contamination | Countersink | Cut Too Short | Instructions Incomplete/Unclear | Drill Holes | Power Loss/Surge | Folio/Program | Grain | Weld | Wrong Stock Pulled | Out of Sequence | Off-set | Mislabeled | Fit/Function | Misaligned/off center | Positioned Wrong | Outside Dimensions | Over/Under tolerance | Part Incorrect | Part Lost/Missing | Part Moved | Drawing | Finish | Misread | Turning Sequence |
|                                                      |        |               |               |                            |          |                       |                  |               |            |                  |               |                     |          |                                              |          |          |                 |                  |         |                     |                     |                       |          | OTHER : _____   |         |                       |        |                        |       |          |            |                    |               |                  |        |           |                      |                                   |               |             |               |                                 |             |                  |               |       |      |                    |                 |         |            |              |                       |                  |                    |                      |                |                   |            |         |        |         |                  |

# Work Order ID 150978

Monday, September 12, 2016 8:56:20 AM

\*150978\*

Item ID: D119-796-141  
Revision ID:

Accept

\*N900040100\*

Setup Start

\*NS1\*

Item Name: FWD Crossstube Installation without Step (no hardware)

Stop

\*NS2\*

Start Date: 8/19/2016 Start Qty: 1.00

\*1\*

Cust Item ID:

Required Date: 9/15/2016 Req'd Qty: 1.00

\*1\*

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Run Start

\*NR1\*

Stop

\*NR2\*

Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Tool ID

Tool #

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

250

OC14- Inspect Spray Paint  
Crossstubes

0.00

\*250\*

Memo

DAS

0.00

QC

\*\*\*VERIFY BY

38

BATCH # TO MATCH W/O

\*\*\*VERIFY BY

38

PART # TO MATCH  
W/O

NOV 01 2016

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Date:

**WORK ORDER NON-CONFORMANCE / UPDATE**

QA Closed:

Date:

Work Order update only

[illegible]



Work Order ID 150978

Monday, September 12, 2016 8:56:20 AM

\*150978\*

Item ID: D119-796-141

Accept

Revision ID:

\*N900040100\*

Setup Start

\*N.S1\*

Item Name: FWD Crossstube Installation without Step (no hardware)

Stop \*N.S2\*

Start Date: 8/19/2016 Start Qty: 1.00

Cust Item ID:

Required Date: 9/15/2016 Req'd Qty: 1.00

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start

\*NR1\*

QC:

Date:

SPC (Y/N):

Date:

Stop

\*NR2\*

Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Tool ID

Tool #

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

252

\*959\*

Crossstubs

0.00

DAS

Memo

1- Re-install non fixed hardware per dwg

\*\*\*Torque all clamps to 80-100 IN-LBS.\*\*\*

2- Apply a file-seal of proseal 890 around supports.

Allow proseal to dry before inspecting.

Proseal 890

Batch: 135852

EXP: 4/17

PROSEAL CURE TIME 72 HOURS:

Start:

Finish:

16.11.08

16-11-4

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

## WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

Work Order update only ☐

|                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                              |                                                                                                                                                                                                       |                       |
|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| Work Order: _____<br><br>Part No. _____<br><br>NCR No. _____ | <b>DISPOSITION</b><br><br><div style="display: flex; justify-content: space-between;"> <div>           Rework <input type="checkbox"/><br/>           Scrap <input type="checkbox"/><br/>           Use-as-is <input type="checkbox"/><br/>           Suspected Unapproved <input type="checkbox"/> </div> <div>           Skid-tube <input type="checkbox"/><br/>           Machining <input type="checkbox"/><br/>           Thermoforming <input type="checkbox"/><br/>           Large Fab <input type="checkbox"/> </div> <div>           Cross tube <input type="checkbox"/><br/>           Small Fab <input type="checkbox"/><br/>           Finishing <input type="checkbox"/><br/>           Composite <input type="checkbox"/> </div> <div>           Water Jet <input type="checkbox"/><br/>           Prod. Eng. Coord. <input type="checkbox"/><br/>           Rec/Store/Packaging <input type="checkbox"/><br/>           Supplier <input type="checkbox"/> </div> <div>           Engineering <input type="checkbox"/><br/>           Quality <input type="checkbox"/><br/>           Other <input type="checkbox"/> </div> </div> | <b>AGAINST DEPARTMENT/PROCESS</b>            | <div style="display: flex; justify-content: space-between;"> <div>           Step #: _____<br/><br/>           Date: _____         </div> <div>           QTY Effective : _____         </div> </div> | MRB (QS1042) Approval |
| Description Work Order Deviation                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Disposition</b>                           |                                                                                                                                                                                                       |                       |
|                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                              |                                                                                                                                                                                                       |                       |
| Completed By                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Lead hand / Supervisor Approval Verification |                                                                                                                                                                                                       |                       |
| QC / QA Coordinator Approval                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | QC / QA Coordinator Approval                 |                                                                                                                                                                                                       |                       |

| Root Cause         |                       | FAULT CATEGORY         |                                   |                       |                      |  |  |  |  |  |  |
|--------------------|-----------------------|------------------------|-----------------------------------|-----------------------|----------------------|--|--|--|--|--|--|
| Environment        | No Re-verification    | Pressure/Forced        | Temperature/Cure                  | Power Loss/ Surge     | Positioned Wrong     |  |  |  |  |  |  |
| Design             | Operator              | Bending                | Set up                            | Folio/Program         | Outside Dimensions   |  |  |  |  |  |  |
| Doc/Data           | Offset/Setup          | Centre Not Concentric  | BOM/Route                         | Grain                 | Over/Under tolerance |  |  |  |  |  |  |
| Equip/Tooling      | Supplier              | Cracks                 | Broken/Damage/Defect              | Weld                  | Part Incorrect       |  |  |  |  |  |  |
| Handling/Pre       | Training              | Crimp/Kink/Ripple/Wave | Inspection Incomplete/Unqualified | Wrong Stock Pulled    | Part Lost/Missing    |  |  |  |  |  |  |
| Material           | Use for Testing       | Cuffs                  | Contamination                     | Out of Sequence       | Part Moved           |  |  |  |  |  |  |
| Internal Transport | Poor Information      | Crushing               | Countersink                       | Off-set               | Drawing              |  |  |  |  |  |  |
| Tribal Knowledge   | Rushing               | Heat Treat             | Cut Too Short                     | Mislabeled            | Finish               |  |  |  |  |  |  |
| LOA                | Product Improvement   | Wave/Twist in Tube     | Instructions Incomplete/Unclear   | Fit/Function          | Misread              |  |  |  |  |  |  |
| Substation         | Process Improvement   | Marks/Chatter          | Drill Holes                       | Misaligned/off center | Turning Sequence     |  |  |  |  |  |  |
| Past Expiry Date   | Manufacturing Process |                        |                                   |                       |                      |  |  |  |  |  |  |
| Misidentified      | Past Due              |                        |                                   |                       |                      |  |  |  |  |  |  |
|                    |                       | OTHER : _____          |                                   |                       |                      |  |  |  |  |  |  |

# Work Order ID 150978

Monday, September 12, 2016 8:56:20 AM

\*150978\*

Item ID: D119-796-141 Accept \*N9000040100\* Setup Start \*N.S.1\*

Revision ID: FWD Crossbute Installation without Step (no hardware) Stop \*N.S.2\*

Item Name: FWD Crossbute Installation without Step (no hardware)

Start Date: 8/19/2016 Start Qty: 1.00 \*1\*

Required Date: 9/15/2016 Req'd Qty: 1.00 \*1\*

Reference: Cust Item ID: Customer:

Approvals: Process Plan: Date: Tooling: Date: Run Start \*NR1\*

QC: Date: SPC (Y/N): Date: Stop \*NR2\*

| Sequence ID/<br>Work Center ID | Operation<br>Description | Set Up/<br>Run Hours | Tool ID | Tool # | Plan<br>Code | Accept<br>Qty | Reject<br>Qty | Reject<br>Number | Insp.<br>Stamp |
|--------------------------------|--------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|
|--------------------------------|--------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|

260 QC5- Inspect part completeness to step on W/O 0.00

QC \*260\*

Memo 0.00

\*\*\*RE-CHECK TORCOUE ON CLAMP AFTER PROSEAL HAS CURED AS PER DWG.\*\*\*

\*\*\*VERIFY BY 5 BATCH # TO MATCH W/O

\*\*\*VERIFY BY 150978 PART # TO MATCH W/O

\*\*\*MASK SCRIBE B# & P# AND VERIFY\*\*\*

290 Packaging 0.00

\*290\*

Packaging 0.00

Memo

Identify and pack for shipping as per PPP D119-796-141

On w/o 151306

1

8-11-16

110/11/08

16 9-89

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

## WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

Work Order update only

|                                                      |                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                            |                                                     |                                               |                       |  |
|------------------------------------------------------|------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|-----------------------------------------------------|-----------------------------------------------|-----------------------|--|
| Work Order: _____<br>Part No. _____<br>NCR No. _____ |                                                | <b>DISPOSITION</b><br><div style="display: flex; justify-content: space-between;"> <div>           Rework <input type="checkbox"/><br/>           Scrap <input type="checkbox"/><br/>           Use-as-is <input type="checkbox"/><br/>           Suspected Unapproved <input type="checkbox"/> </div> <div>           Skid-tube <input type="checkbox"/><br/>           Machining <input type="checkbox"/><br/>           Thermoforming <input type="checkbox"/><br/>           Large Fab <input type="checkbox"/> </div> <div>           Cross tube <input type="checkbox"/><br/>           Small Fab <input type="checkbox"/><br/>           Finishing <input type="checkbox"/><br/>           Composite <input type="checkbox"/> </div> <div>           Water Jet <input type="checkbox"/><br/>           Prod. Eng. Coord. <input type="checkbox"/><br/>           Rec/Store/Packaging <input type="checkbox"/><br/>           Supplier <input type="checkbox"/> </div> <div>           Engineering <input type="checkbox"/><br/>           Quality <input type="checkbox"/><br/>           Other <input type="checkbox"/> </div> </div> |                                                            | <b>AGAINST DEPARTMENT/PROCESS</b>                   |                                               | MRB (QS1042) Approval |  |
| Date: _____ Step #: _____                            |                                                | QTY Effective : _____                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                            |                                                     |                                               |                       |  |
| <b>Description Work Order Deviation</b>              |                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                            | <b>Disposition</b>                                  |                                               |                       |  |
|                                                      |                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                            |                                                     |                                               |                       |  |
| <b>Root Cause</b>                                    |                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                            | <b>FAULT CATEGORY</b>                               |                                               |                       |  |
| Environment <input type="checkbox"/>                 | No Re-verification <input type="checkbox"/>    | Pressure/Forced <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Temperature/Cure <input type="checkbox"/>                  | Power Loss/Surge <input type="checkbox"/>           | Positioned Wrong <input type="checkbox"/>     |                       |  |
| Design <input type="checkbox"/>                      | Operator <input type="checkbox"/>              | Bending <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Set-up <input type="checkbox"/>                            | Folio/Program <input type="checkbox"/>              | Outside Dimensions <input type="checkbox"/>   |                       |  |
| Doc/Data <input type="checkbox"/>                    | Offset/Setup <input type="checkbox"/>          | Centre Not Concentric <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | BOM/Route <input type="checkbox"/>                         | Grain <input type="checkbox"/>                      | Over/Under tolerance <input type="checkbox"/> |                       |  |
| Equip/Tooling <input type="checkbox"/>               | Supplier <input type="checkbox"/>              | Cracks <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Broken/Damage/Defect <input type="checkbox"/>              | Weld <input type="checkbox"/>                       | Part Incorrect <input type="checkbox"/>       |                       |  |
| Handling/Pre <input type="checkbox"/>                | Training <input type="checkbox"/>              | Crimp/Kink/Ripple/Wave <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Inspection Incomplete/Unqualified <input type="checkbox"/> | Wrong Stock Pulled <input type="checkbox"/>         | Part Lost/Missing <input type="checkbox"/>    |                       |  |
| Material <input type="checkbox"/>                    | Use for Testing <input type="checkbox"/>       | Cuffs <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Contamination <input type="checkbox"/>                     | Out of Sequence <input type="checkbox"/>            | Part Moved <input type="checkbox"/>           |                       |  |
| Internal Transport <input type="checkbox"/>          | Poor Information <input type="checkbox"/>      | Crushing <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Countersink <input type="checkbox"/>                       | Off-set <input type="checkbox"/>                    | Drawing <input type="checkbox"/>              |                       |  |
| Tribal Knowledge <input type="checkbox"/>            | Rushing <input type="checkbox"/>               | Heat Treat <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Cut Too Short <input type="checkbox"/>                     | Mislabeled <input type="checkbox"/>                 | Finish <input type="checkbox"/>               |                       |  |
| LOA <input type="checkbox"/>                         | Product Improvement <input type="checkbox"/>   | Wave/Twist in Tube <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Instructions Incomplete/Unclear <input type="checkbox"/>   | Fit/Function <input type="checkbox"/>               | Misread <input type="checkbox"/>              |                       |  |
| Substation <input type="checkbox"/>                  | Process Improvement <input type="checkbox"/>   | Marks/Chatter <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Drill Holes <input type="checkbox"/>                       | Misaligned/off center <input type="checkbox"/>      | Turning Sequence <input type="checkbox"/>     |                       |  |
| Past Expiry Date <input type="checkbox"/>            | Manufacturing Process <input type="checkbox"/> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                            |                                                     |                                               |                       |  |
| Misidentified <input type="checkbox"/>               | Past Due <input type="checkbox"/>              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                            |                                                     |                                               |                       |  |
|                                                      |                                                | OTHER : _____                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                            |                                                     |                                               |                       |  |
| <b>Completed By</b>                                  |                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                            | <b>Lead hand / Supervisor Approval Verification</b> |                                               |                       |  |
|                                                      |                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                            | <b>QC / QA Coordinator Approval</b>                 |                                               |                       |  |

Work Order ID 150978

\*150978\*

Monday, September 12, 2016 8:56:20 AM

Item ID: D119-796-141

Accept

Revision ID:

\*N900040100\*

Setup Start

\*N.S1\*

Item Name: FWD Crossrube Installation without Step (no hardware)

Stop

\*N.S2\*

Start Date: 8/19/2016

Start Qty: 1.00

\*1\*

Cust Item ID:

Required Date: 9/15/2016

Req'd Qty: 1.00

\*1\*

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start

\*NR1\*

QC:

Date:

SPC (Y/N):

Date:

Stop

\*NR2\*

Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Tool ID

Tool #

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

300

OC21 - Final Inspection - Work Order Release

0.00

\*300\*

Memo

0.02

Quality Control

16-11-8

16/11/9

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

## WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

Work Order update only

|                                                                                                                                                                                                                                                         |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                    |                                   |  |                              |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------------|--|------------------------------|--|
| <b>Work Order:</b> _____<br><b>Part No.:</b> _____<br><b>NCR No.:</b> _____                                                                                                                                                                             |  | <b>DISPOSITION</b><br><div style="display: flex; justify-content: space-between;"> <div>           Rework <input type="checkbox"/><br/>           Scrap <input type="checkbox"/><br/>           Use-as-is <input type="checkbox"/><br/>           Suspected Unapproved <input type="checkbox"/> </div> <div>           Skid-tube <input type="checkbox"/><br/>           Machining <input type="checkbox"/><br/>           Thermoforming <input type="checkbox"/><br/>           Large Fab <input type="checkbox"/> </div> <div>           Cross tube <input type="checkbox"/><br/>           Small Fab <input type="checkbox"/><br/>           Finishing <input type="checkbox"/><br/>           Composite <input type="checkbox"/> </div> <div>           Water Jet <input type="checkbox"/><br/>           Prod. Eng. Coord. <input type="checkbox"/><br/>           Rec/Store/Packaging <input type="checkbox"/><br/>           Supplier <input type="checkbox"/> </div> <div>           Engineering <input type="checkbox"/><br/>           Quality <input type="checkbox"/><br/>           Other <input type="checkbox"/> </div> </div> |                    | <b>AGAINST DEPARTMENT/PROCESS</b> |  | <b>MRB (QS1042) Approval</b> |  |
| <b>Date :</b> _____                                                                                                                                                                                                                                     |  | <b>Step #:</b> _____                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                    | <b>QTY Effective :</b> _____      |  |                              |  |
| <b>Description Work Order Deviation</b>                                                                                                                                                                                                                 |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>Disposition</b> |                                   |  |                              |  |
|                                                                                                                                                                                                                                                         |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                    |                                   |  |                              |  |
| <div style="display: flex; justify-content: space-between;"> <div> <b>Completed By</b><br/> <br/> </div> <div> <b>Lead hand / Supervisor Approval Verification</b><br/> <br/> </div> <div> <b>QC / QA Coordinator Approval</b><br/> <br/> </div> </div> |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                    |                                   |  |                              |  |

| Root Cause         |                       | FAULT CATEGORY         |                                   |                       |                      |  |  |  |  |  |  |
|--------------------|-----------------------|------------------------|-----------------------------------|-----------------------|----------------------|--|--|--|--|--|--|
| Environment        | No Re-verification    | Pressure/Forced        | Temperature/Cure                  | Power Loss/Surge      | Positioned Wrong     |  |  |  |  |  |  |
| Design             | Operator              | Bending                | Set-up                            | Folio/Program         | Outside Dimensions   |  |  |  |  |  |  |
| Doc/Data           | Offset/Setup          | Centre Not Concentric  | BOM/Route                         | Grain                 | Over/Under tolerance |  |  |  |  |  |  |
| Equip/Tooling      | Supplier              | Cracks                 | Broken/Damage/Defect              | Weld                  | Part Incorrect       |  |  |  |  |  |  |
| Handling/Pre       | Training              | Crimp/Kink/Ripple/Wave | Inspection Incomplete/Unqualified | Wrong Stock Pulled    | Part Lost/Missing    |  |  |  |  |  |  |
| Material           | Use for Testing       | Cuffs                  | Contamination                     | Out of Sequence       | Part Moved           |  |  |  |  |  |  |
| Internal Transport | Poor Information      | Crushing               | Countersink                       | Off-set               | Drawing              |  |  |  |  |  |  |
| Tribal Knowledge   | Rushing               | Heat Treat             | Cut Too Short                     | Mislabeled            | Finish               |  |  |  |  |  |  |
| LOA                | Product Improvement   | Wave/Twist in Tube     | Instructions Incomplete/Unclear   | Fit/Function          | Misread              |  |  |  |  |  |  |
| Substation         | Process Improvement   | Marks/Chatter          | Drill Holes                       | Misaligned/off center | Turning Sequence     |  |  |  |  |  |  |
| Past Expiry Date   | Manufacturing Process |                        |                                   |                       |                      |  |  |  |  |  |  |
| Misidentified      | Past Due              |                        |                                   |                       |                      |  |  |  |  |  |  |
|                    |                       | OTHER :                |                                   |                       |                      |  |  |  |  |  |  |

# Picklist Print

Monday, September 12, 2016 8:56:20 AM

Work Order ID: 150978

**\*150978\***

Parent Item: D119-796-141

**\*D119-796-141\***

Parent Item Name: FWD Crosstube Installation without Step (no hardware)

Start Date: 8/19/2016

Required Date: 9/15/2016

Start Qty: 1.00

Required Qty: 1.00

## Comments:

IPP REV:A 14.09.03 NEW ISSUE DD VERF:JLM IPP  
REV:B 14.10.15 AS PER REV.B DD VERF:JLM IPP REV:C  
14.11.19 AS PER REV.C DD VERF:JLM IPP REV:D 14.12.12  
AS PER REV.pd1 DD VERF:JLM IPP REV:E 15.02.11 AS PER  
REV F JLM VERIFIED BY:DD

| Component Item ID/<br>Item Name | Replacement<br>Item ID | Mfg/<br>Purch | Bin<br>Item | Primary<br>Location | Last<br>Location | Route<br>Seq ID | Unit of<br>Measure | Qty on<br>Hand | Qty per Kit | Total<br>Qty | Qty<br>Issued | Date<br>Issued | Status |
|---------------------------------|------------------------|---------------|-------------|---------------------|------------------|-----------------|--------------------|----------------|-------------|--------------|---------------|----------------|--------|
|---------------------------------|------------------------|---------------|-------------|---------------------|------------------|-----------------|--------------------|----------------|-------------|--------------|---------------|----------------|--------|

D5305-1 Manufactured No Each 14.0000 2

**\*D5305-1\***

Shim

**\*\***

*27.10.16*

Location Loc Qty Loc Code

LG056 14  
140640  
142707  
146820

14  
4  
1  
9

2

D119-796-141TRN

Manufactured No

**\*D119-796-141TRN\***

Crosstube Turning Detail

D2873-043

Manufactured No

**\*D2873-043\***

Nut Plate Assembly

**\*\***

Each 56.0000

4

*151871*

**\*\***

*012 16-10-18*

*27.10.16*

Location Loc Qty Loc Code

LG050 56  
146581  
148548

56  
26  
30

4

H:/FORMS/Quality Assurance/approved QA/NCRWO Rev I





DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

## WORK ORDER NON-CONFORMANCE / UPDATE

Work Order update only



| Work Order: _____<br>Part No. _____<br>NCR No. _____ |                       | DISPOSITION            |                                   | AGAINST DEPARTMENT/PROCESS |                      |               |  |            |  |                     |  |             |  |
|------------------------------------------------------|-----------------------|------------------------|-----------------------------------|----------------------------|----------------------|---------------|--|------------|--|---------------------|--|-------------|--|
| Date : _____                                         |                       | Suspected Unapproved   |                                   | Rework                     |                      | Skid-tube     |  | Cross tube |  | Water Jet           |  | Engineering |  |
| Step #: _____                                        |                       | Use-as-is              |                                   | Scrap                      |                      | Machining     |  | Small Fab  |  | Prod. Eng. Coord.   |  | Quality     |  |
| Date : _____                                         |                       | Unapproved             |                                   | Use-as-is                  |                      | Thermoforming |  | Finishing  |  | Rec/Store/Packaging |  | Other       |  |
| Description Work Order Deviation                     |                       | QTY Effective : _____  |                                   | MRB (QS1042) Approval      |                      |               |  |            |  |                     |  |             |  |
| Disposition                                          |                       |                        |                                   |                            |                      |               |  |            |  |                     |  |             |  |
| Completed By                                         |                       |                        |                                   |                            |                      |               |  |            |  |                     |  |             |  |
| Lead hand / Supervisor Approval Verification         |                       |                        |                                   |                            |                      |               |  |            |  |                     |  |             |  |
| QC / QA Coordinator Approval                         |                       |                        |                                   |                            |                      |               |  |            |  |                     |  |             |  |
| FAULT CATEGORY                                       |                       |                        |                                   |                            |                      |               |  |            |  |                     |  |             |  |
| Root Cause                                           |                       |                        |                                   |                            |                      |               |  |            |  |                     |  |             |  |
| Environment                                          | No Re-verification    | Pressure/Forced        | Temperature/Cure                  | Power Loss/Surge           | Positioned Wrong     |               |  |            |  |                     |  |             |  |
| Design                                               | Operator              | Bending                | Set-up                            | Folio/Program              | Outside Dimensions   |               |  |            |  |                     |  |             |  |
| Doc/Data                                             | Offset/Setup          | Centre Not Concentric  | BOM/Route                         | Grain                      | Over/Under tolerance |               |  |            |  |                     |  |             |  |
| Equip/Tooling                                        | Supplier              | Cracks                 | Broken/Damage/Defect              | Weld                       | Part Incorrect       |               |  |            |  |                     |  |             |  |
| Handling/Pre                                         | Training              | Crimp/Kink/Ripple/Wave | Inspection Incomplete/Unqualified | Wrong Stock Pulled         | Part Lost/Missing    |               |  |            |  |                     |  |             |  |
| Material                                             | Use for Testing       | Cuffs                  | Contamination                     | Out of Sequence            | Part Moved           |               |  |            |  |                     |  |             |  |
| Internal Transport                                   | Poor Information      | Crushing               | Countersink                       | Off-set                    | Drawing              |               |  |            |  |                     |  |             |  |
| Tribal Knowledge                                     | Rushing               | Heat Treat             | Cut Too Short                     | Mislabeled                 | Finish               |               |  |            |  |                     |  |             |  |
| LOA                                                  | Product Improvement   | Wave/Twist in Tube     | Instructions Incomplete/Unclear   | Fit/Function               | Misread              |               |  |            |  |                     |  |             |  |
| Substation                                           | Process Improvement   | Marks/Chatter          | Drill Holes                       | Misaligned/off center      | Turning Sequence     |               |  |            |  |                     |  |             |  |
| Past Expiry Date                                     | Manufacturing Process |                        |                                   |                            |                      |               |  |            |  |                     |  |             |  |
| Misidentified                                        | Past Due              |                        |                                   |                            |                      |               |  |            |  |                     |  |             |  |
| OTHER : _____                                        |                       |                        |                                   |                            |                      |               |  |            |  |                     |  |             |  |

Picklist Print

Monday, September 12, 2016 8:56:20 AM

Work Order ID: 150978

\*150978\*

Parent Item: D119-796-141

\*D119-796-141\*

Parent Item Name: FWD Crosscube Installation without Step (no hardware)

Start Date: 8/19/2016 Required Date: 9/15/2016  
Start Qty: 1.00 Required Qty: 1.00

MS21920-24

Purchased No

Each

81.0000

4

\*MS21920-24\*

\*\*

Clamp

25.10.16

| <u>Location</u> | <u>Loc Qty</u> | <u>Loc Code</u> |   |
|-----------------|----------------|-----------------|---|
| FG              | 2              |                 |   |
| 117998          | 2              |                 |   |
| LG050           | 79             |                 |   |
| m133932         | 1              |                 |   |
| m134502         | 25             |                 |   |
| m134861         | 4              |                 |   |
| m135297         | 24             |                 | 4 |
| m135544         | 25             |                 |   |

Date: \_\_\_\_\_

**WORK ORDER NON-CONFORMANCE / UPDATE**

QA Closed: Date:

Date:

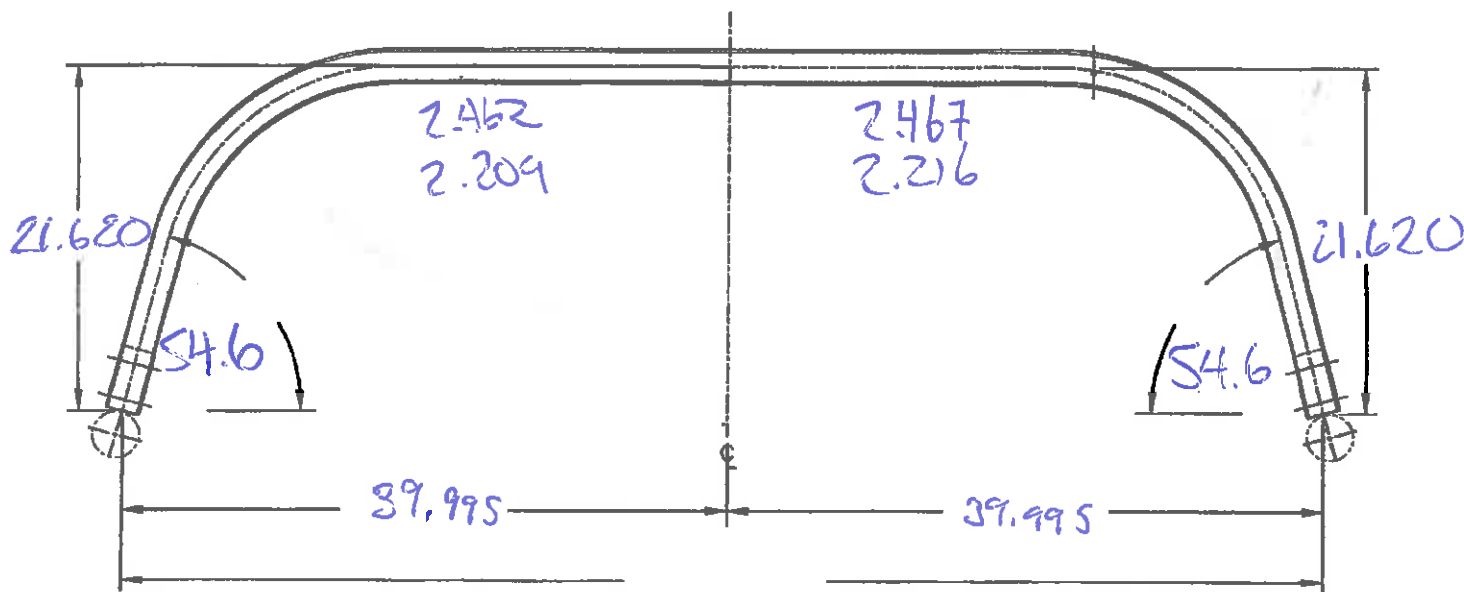
Work Order update only

|                                                              |  |                                                                                                                                                                                           |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |  |  |
|--------------------------------------------------------------|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|
| Work Order: _____<br><br>Part No. _____<br><br>NCR No. _____ |  | <b>DISPOSITION</b><br><br><div> <input type="checkbox"/> Rework           <input type="checkbox"/> Scrap           <input type="checkbox"/> Use-as-is         </div> Suspected Unapproved |  | <b>AGAINST DEPARTMENT/PROCESS</b><br><br><div> <div> <input type="checkbox"/> Skid-tube           <input type="checkbox"/> Machining           <input type="checkbox"/> Thermoforming           <input type="checkbox"/> Large Fab         </div> <div> <input type="checkbox"/> Cross tube           <input type="checkbox"/> Small Fab           <input type="checkbox"/> Finishing           <input type="checkbox"/> Composite         </div> <div> <input type="checkbox"/> Water Jet           <input type="checkbox"/> Prod. Eng. Coord.<br/> <input type="checkbox"/> Rec/Store/Packaging<br/> <input type="checkbox"/> Supplier         </div> <div> <input type="checkbox"/> Engineering Quality           <input type="checkbox"/> Other         </div> </div> |  |  |  |
| Date : _____                                                 |  | Step #: _____                                                                                                                                                                             |  | QTY Effective : _____                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |  |  |
| Description Work Order Deviation                             |  | Disposition                                                                                                                                                                               |  | MRB (QSI042) Approval                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |  |  |
|                                                              |  |                                                                                                                                                                                           |  | Completed By                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |  |
|                                                              |  |                                                                                                                                                                                           |  | Lead hand / Supervisor Approval Verification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |  |
|                                                              |  |                                                                                                                                                                                           |  | QC / QA Coordinator Approval                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |  |

| Root Cause         |                       | FAULT CATEGORY         |                                   |                       |                      |  |  |  |  |  |  |
|--------------------|-----------------------|------------------------|-----------------------------------|-----------------------|----------------------|--|--|--|--|--|--|
| Environment        | No Re-verification    | Pressure/Forced        | Temperature/Cure                  | Power Loss/Surge      | Positioned Wrong     |  |  |  |  |  |  |
| Design             | Operator              | Bending                | Set-up                            | Folio/Program         | Outside Dimensions   |  |  |  |  |  |  |
| Doc/Data           | Offset/Setup          | Centre Not Concentric  | BOM/Route                         | Grain                 | Over/Under tolerance |  |  |  |  |  |  |
| Equip/Tooling      | Supplier              | Cracks                 | Broken/Damage/Defect              | Weld                  | Part Incorrect       |  |  |  |  |  |  |
| Handling/Pre       | Training              | Crimp/Kink/Ripple/Wave | Inspection Incomplete/Unqualified | Wrong Stock Pulled    | Part Lost/Missing    |  |  |  |  |  |  |
| Material           | Use for Testing       | Cuffs                  | Contamination                     | Out of Sequence       | Part Moved           |  |  |  |  |  |  |
| Internal Transport | Poor Information      | Crushing               | Countersink                       | Off-set               | Drawing              |  |  |  |  |  |  |
| Tribal Knowledge   | Rushing               | Heat Treat             | Cut Too Short                     | Mislabeled            | Finish               |  |  |  |  |  |  |
| LOA                | Product Improvement   | Wave/Twist in Tube     | Instructions Incomplete/Unclear   | Fit/Function          | Misread              |  |  |  |  |  |  |
| Substation         | Process Improvement   | Marks/Chatter          | Drill Holes                       | Misaligned/off center | Turning Sequence     |  |  |  |  |  |  |
| Past Expiry Date   | Manufacturing Process |                        |                                   |                       |                      |  |  |  |  |  |  |
| Misidentified      | Past Due              |                        |                                   |                       |                      |  |  |  |  |  |  |
|                    |                       | OTHER :                |                                   |                       |                      |  |  |  |  |  |  |

|                                                   |  |                     |              |
|---------------------------------------------------|--|---------------------|--------------|
| <b>DART AEROSPACE LTD</b>                         |  | <b>Work Order:</b>  | 150978       |
| <b>Description:</b> Crosstube Fwd, with Step      |  | <b>Part Number:</b> | D119-796-141 |
| <b>Inspection Dwg:</b> D119-796-141 <b>Rev:</b> H |  | <b>Page 1 of 1</b>  |              |

| Required Dimension | Min    | Max    |
|--------------------|--------|--------|
| Height             | 21.490 | 21.750 |
| 1/2 Span           | 39.820 | 40.080 |
| Angle              | 54°    | 57°    |
| Total Span         | 79.640 | 80.160 |
| Bending Passes     | 8      | --     |
| Crushing           | --     | 6.8%   |



|                | Side A | Side B |
|----------------|--------|--------|
| Bending Passes | 8      | 8      |
| Crushing       | 5.4%   | 5.3%   |
| Comments       |        |        |
|                |        |        |
|                |        |        |
|                |        |        |
|                |        |        |

|                 |          |
|-----------------|----------|
| QC15 Inspection | marg/L   |
| Date            | 16/10/18 |

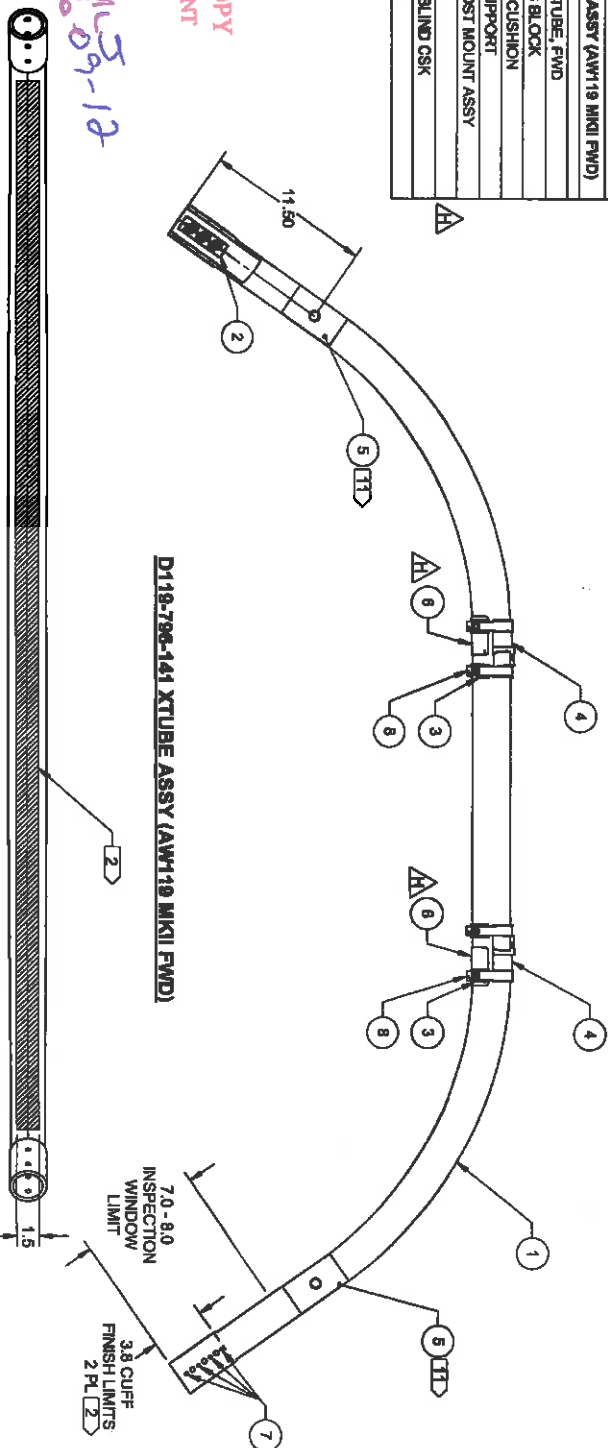
| Rev | Date     | Change          | Revised by | Approved |
|-----|----------|-----------------|------------|----------|
| A   | 15.04.14 | New Issue       | KJ         |          |
| B   | 15.11.12 | Dwg Rev updated | KJ         |          |
| C   | 16.01.15 | Dwg Rev updated | KJ         | up       |



| ITEM | QTY | PIN             | DESCRIPTION                 |
|------|-----|-----------------|-----------------------------|
| 1    | X   | D119-796-141    | XTUBE ASSY (AW119 MKII FWD) |
| 2    | 1   | D119-796-141BND | CROSSTUBE, FWD              |
| 3    | 4   | D2873-043       | RADIUS BLOCK                |
| 4    | 2   | D5123-3         | CLAMP CUSHION               |
| 5    | 2   | D5124-1         | FWD SUPPORT                 |
| 6    | 2   | D5152-041       | FWD POST MOUNT ASSY         |
| 7    | 2   | D5305-1         | SHIM                        |
| 8    | 16  | CR3212-4-08     | RIVET, BLIND CSK            |
| 9    | 4   | MS21920-24      | CLAMP                       |

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UNCONTROLLED COPY  
SUBJECT TO AMENDMENT  
WITHOUT NOTICE

WORK ORDER  
NO 150918 MJS  
1609-12



D119-796-141 XTUBE ASSY (AW119 MKII FWD)

RELEASED  
2015-11-04  
EOW 5-4-92

- NOTES:
- 1) MATERIAL: N/A
  - 2) FINISH: APPLY MATTE CLEAR COAT PER OSI 005 42 MASK D5124-1 FWD SUPPORTS D5305-1 SHIMS AS WELL AS UNDERSIDE OF CROSSTUBE AS SHOWN (B3-1, HATCHED AREA), PAIN OUTSIDE PER PART D5100B 42 AFTER APPLYING CLEAR COAT TO CUT-INS IN LOCATION SHOWN, MASK PRIOR TO FINISHING
  - 3) TO SPACINGS: PER PART D51018 UNLESS OTHERWISE NOTED
  - 4) UNITS: SQUARE INCHES UNLESS OTHERWISE NOTED
  - 5) IDENTIFICATION: IDENTIFY USING PART NUMBER "D119-796-141" AND BATCH NUMBER ON INSIDE OF CLIFF PER OSI 044 6.4
  - 6) WEIGHT: 16.34 LB
  - 7) EXTERNAL COAT: MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE.
  - 8) DEFECTS UP TO 0.005 MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
  - 9) PRIOR TO FINISHING, ABRASE MATTING SURFACES OF D5124-1 FWD SUPPORTS AND CROSSTUBE WITH SCOTCH BRITE 7447 RED AND REMOVE RESIDUE WITH DUPONT 4108S WASHN-WIPE DEGRASER. APPLY A 0.1 MIN THK LAYER OF PROSEAL 880 ON THE INSIDE CONCAVE SURFACE OF THE D5124-1 FWD SUPPORTS AND INSTALL AT AN 8.4" OFFSET FROM THE CROSSTUBE BENDING PLANE. INSTALL THE MS21920-24 CLAMPS AND D5123-3 CLAMP CUSHIONS WHILE WET.
  - 10) TORQUE MS21920 CLAMPS 80 - 100 IN.LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY. THE NUT IS FACING AFT AND HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 880 SEALANT HAS CURED FOR 72 HOURS.
  - 11) PRIOR TO FINISHING, ABRASE MATTING SURFACES OF CROSSTUBE AND D5152-041 WITH SCOTCH BRITE 7447 RED AND REMOVE RESIDUE WITH DUPONT 4108S WASHN-WIPE DEGRASER. INSTALL D5152-041 WITH LAYER OF PROSEAL 880 ON INSIDE CONCAVE SURFACE, 0.1 MIN THK. LOCATE D5152-041 USING TOOL DT10088.
  - 12) PRIOR TO FINISHING, ABRASE MATTING SURFACES OF CROSSTUBE AND D5305-1 SHIM WITH SCOTCH BRITE 7447 RED AND REMOVE RESIDUE WITH DUPONT 4108S WASHN-WIPE DEGRASER. INSTALL D5305-1 SHIM WITH LAYER OF PROSEAL 880 ON INSIDE CONCAVE SURFACE, 0.1 MIN THK. USE ADDITIONAL TEMPORARY MS21920-24 CLAMP TO APPLY CLAMPING PRESSURE FOR 72 HOURS.

APPROVED

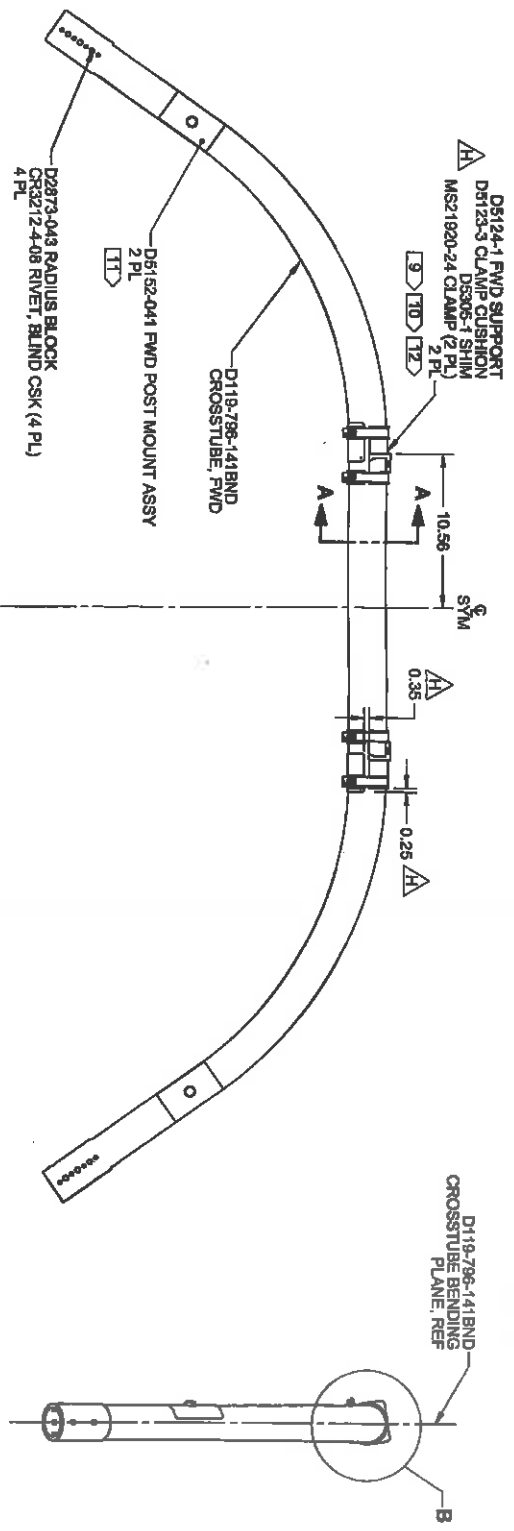
| REV | DESCRIPTION                                                                                                                                                                                                                                    | DATE     | BY |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----|
| A   | NEW ISSUE                                                                                                                                                                                                                                      | 14.08.09 | AP |
| B   | ADDED D5305-1 SHIM, D5152-041 WAS D5305-103, D5124-1 CLIFF DIA TOLERANCE INCREASED TO +/- 0.005                                                                                                                                                | 15.04.24 | AP |
| C   | REMOVED PROSEAL 880 FROM CLIFFS, 2.516 WAS 2.500 (CR-3)                                                                                                                                                                                        | 15.02.03 | AP |
| D   | D5152-041 FWD STEP POST ASSY WAS D5152-041 STEP POST, SCOTCH BRITE 7447 RED WAS 180 GRIT SAND-PAVER, ANGLE (87.2) DIMENSIONED FROM NEW BATHING DETAIL TO SHEET 1, MODIFIED NOTES ON BHT 1 & 3                                                  | 14.11.25 | DB |
| E   | CR3212-4-07 RIVETS WERE CR3212-4-08, 7.8 D5305 CLIFF ANGLE OFF-SET REMOVED, BHT 3, CLIFF DIAMETER ON D5152-041 FWD STEP POST WAS 180 GRIT SAND-PAVER, ANGLE (87.2) DIMENSIONED FROM NEW BATHING DETAIL TO SHEET 1, MODIFIED NOTES ON BHT 1 & 3 | 14.10.23 | AP |
| F   | ADDED D5305-1 SHIM, D5152-041 WAS D5305-103, D5124-1 CLIFF DIA TOLERANCE INCREASED TO +/- 0.005                                                                                                                                                | 14.08.02 | AP |
| G   | ADDED D5305-1 SHIM, D5152-041 WAS D5305-103, D5124-1 CLIFF DIA TOLERANCE INCREASED TO +/- 0.005                                                                                                                                                | 14.08.02 | AP |
| H   | ADDED D5305-1 SHIM, D5152-041 WAS D5305-103, D5124-1 CLIFF DIA TOLERANCE INCREASED TO +/- 0.005                                                                                                                                                | 14.08.02 | AP |

| DESIGN   | AP       | DATE     | BY |
|----------|----------|----------|----|
| DRAWN    | AP       | 14.08.09 | AP |
| CHECKED  | AP       | 14.08.09 | AP |
| APPROVED | AP       | 14.08.09 | AP |
| DATE     | 15.10.13 |          |    |

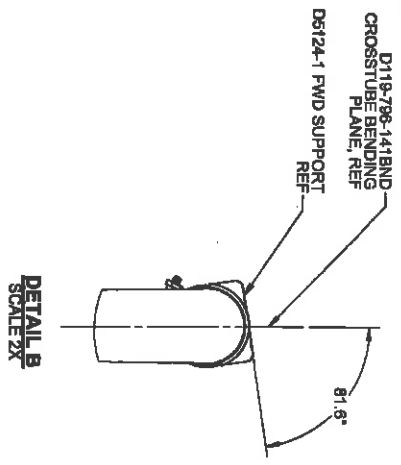
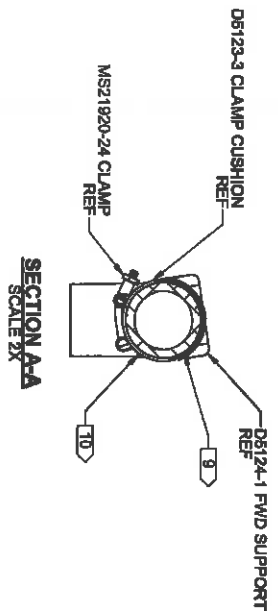
DART AEROSPACE LTD  
HAWKESBURY, ONTARIO, CANADA  
REV. H  
SHEET 1 OF 8  
SCALE  
NTS







D119-796-141 XTUBE ASSY (AW119 MKII FWD)

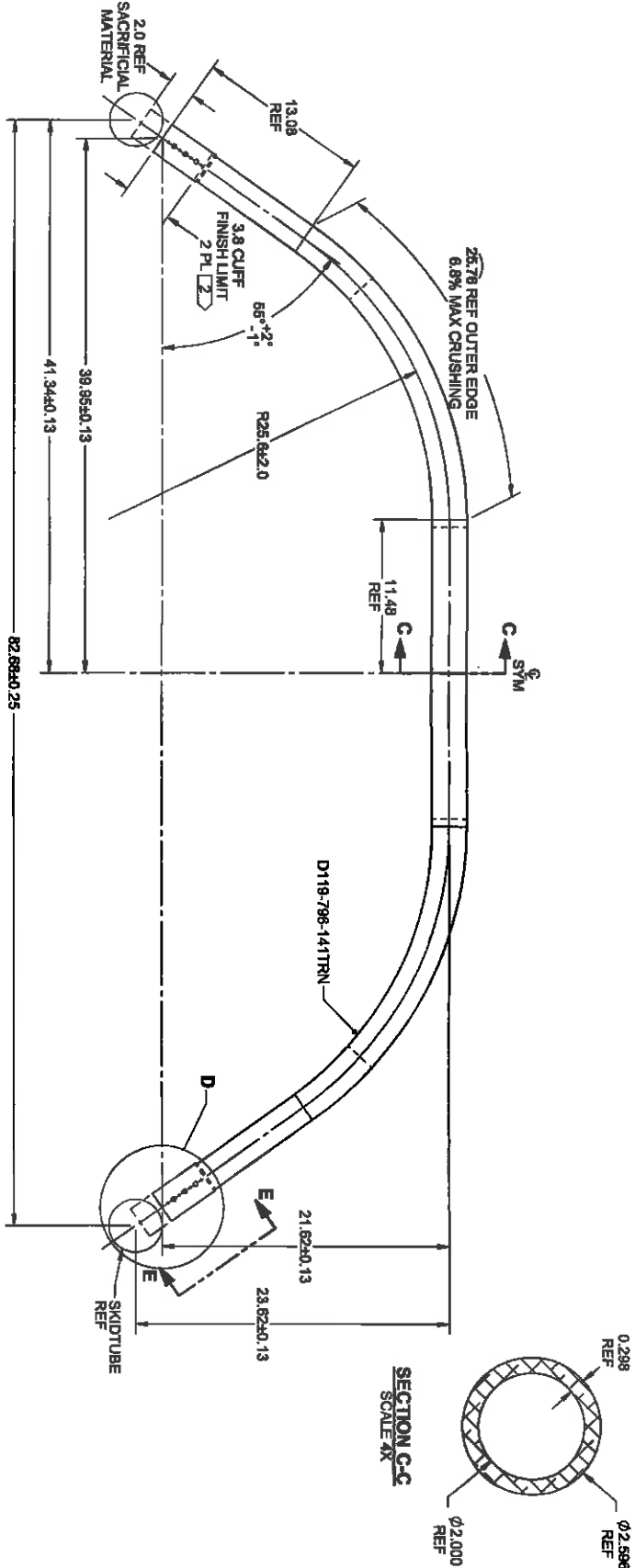


|            |          |    |                             |
|------------|----------|----|-----------------------------|
| DESIGN     | AP       | AP | DART AEROSPACE LTD          |
| DRAWN      | AP       | AP | HAVESBURY, ONTARIO, CANADA  |
| CHECKED    | AS       | AS | DRAWING NO.                 |
| MFG. APPR. | JM       | JM | D119-796-141                |
| APPROVED   | WM       | WM | REV. H                      |
| DATE       | 15.10.13 | DS | SHEET 2 OF 6                |
|            |          |    | SCALE                       |
|            |          |    | NTS                         |
|            |          |    | TITLE                       |
|            |          |    | XTUBE ASSY (AW119 MKII FWD) |

RELEASED  
2015-11-04  
APPROVED

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# **D118-796-141BND CROSS-TUBE, FWD** BENDING AND DRILLING DETAIL

- NOTES:**
- 1) MATERIAL: MADE FROM D118-796-141TRN
  - 2) FINISH: CHEMICAL CONVERSION COAT PER PART QSI 005 4.1
  - 3) TOLERANCES: PER PART QSI 018 UNLESS OTHERWISE NOTED
  - 4) UNITS: INCHES UNLESS OTHERWISE NOTED
  - 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX
  - 6) IDENTIFICATION: NONE
  - 7) WEIGHT: 16.70 LBS
  - 8) PART IS SYMMETRICAL ABOUT CENTERLINE
  - 9) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES, MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6.8% BASED ON OD.
  - 10) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSS-TUBE PER QSI 038
  - 11) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM DEFECTS SUCH AS SCRATCHES, NICKS OR DENTS. DEFECTS UP TO 0.005 MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.

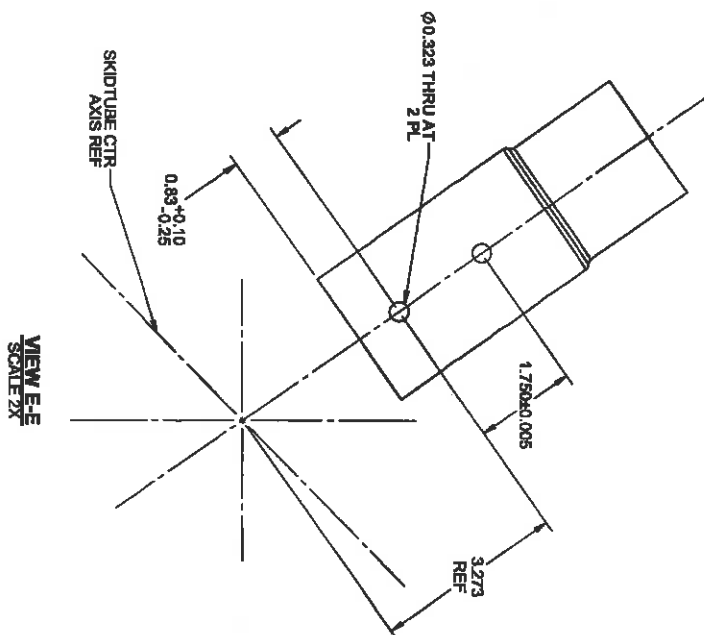
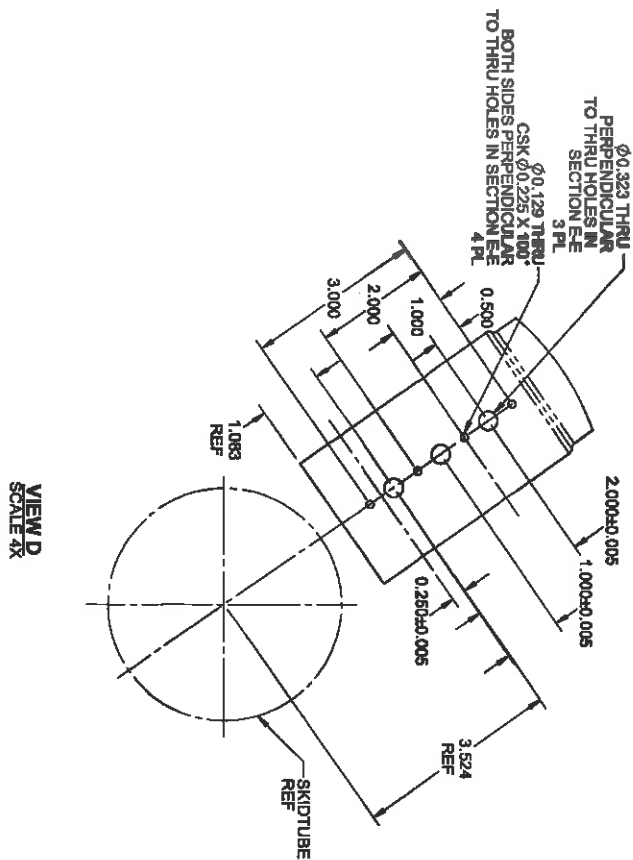
**RELEASED**  
2015-11-04

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| DESIGN     | AP       | AP       | DART AEROSPACE LTD          |
|------------|----------|----------|-----------------------------|
| DRAWN      | AP       | AP       | HAWKESBURY, ONTARIO, CANADA |
| CHECKED    | AS       | AS       | DRAWING NO. D118-796-141    |
| MFG. APPR. | LM       | LM       | REV. H                      |
| APPROVED   | WM       | WM       | SHEET 3 OF 8                |
| DE APPR.   | DS       | DS       | SCALE                       |
| DATE       | 15.10.13 | 15.10.13 | NTS                         |

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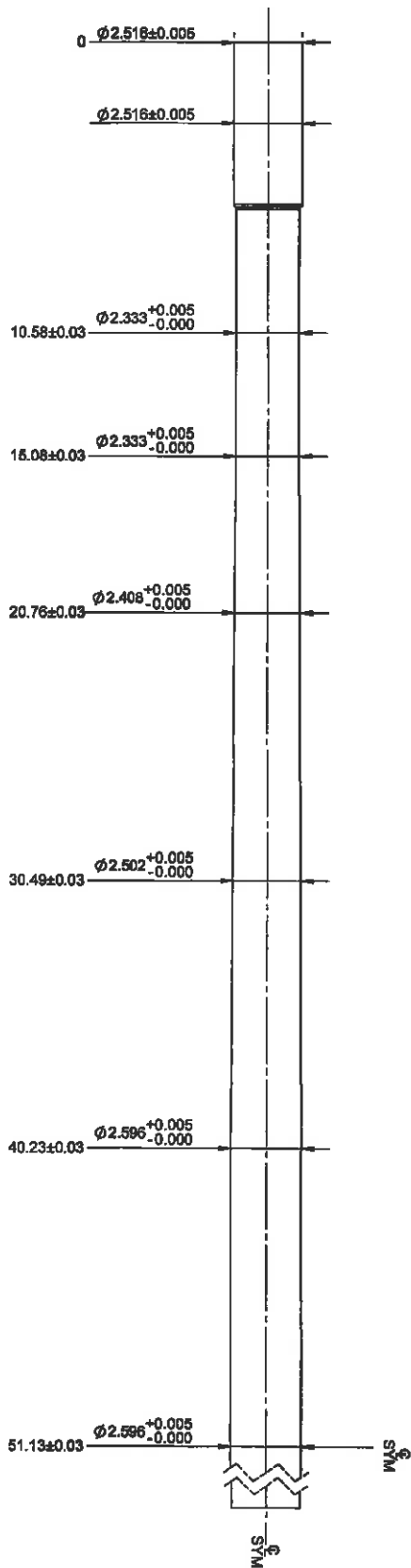


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2015-11-04  
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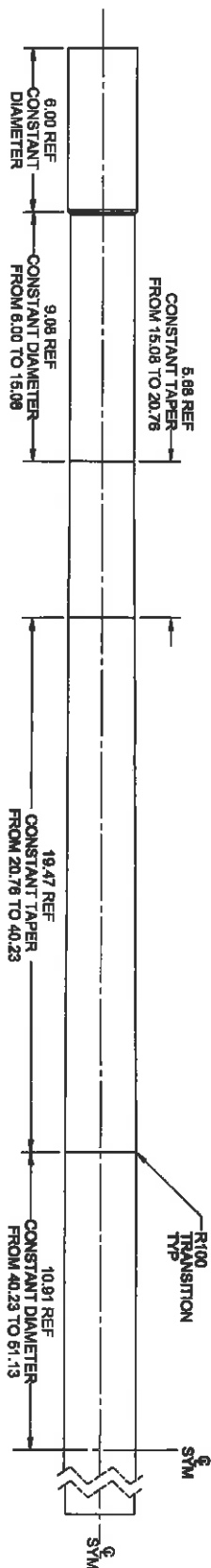
|            |          |      |                             |
|------------|----------|------|-----------------------------|
| DESIGN     | AP       | AP   | DART AEROSPACE LTD          |
| DRAWN      | AP       | AP   | HAWKESBURY, ONTARIO, CANADA |
| CHECKED    | ALB      | ALB  | DRAWING NO.                 |
| MFG. APPR. | ILM      | ILM  | D119-796-141                |
| APPROVED   | WM       | WM   | REV. H                      |
| DATE       | 15.10.13 | DS-1 | SHEET 4 OF 8                |
|            |          |      | SCALE                       |
|            |          |      | NTS                         |

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# D119-796-141TRN CROSSTUBE, FWD



- NOTES:
- 1) MATERIAL: MANUFACTURE FROM D6024-103 (PREFERRED) OR D6005-103
  - 2) FINISH: NONE
  - 3) TO FINISHES: PER PART 051 018 UNLESS OTHERWISE NOTED
  - 4) UNITS: INCHES UNLESS OTHERWISE NOTED
  - 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX
  - 6) IDENTIFICATION: NONE
  - 7) WEIGHT: 16.70 LBS
  - 8) PART IS SYMMETRICAL ABOUT CENTERLINE

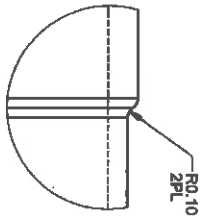
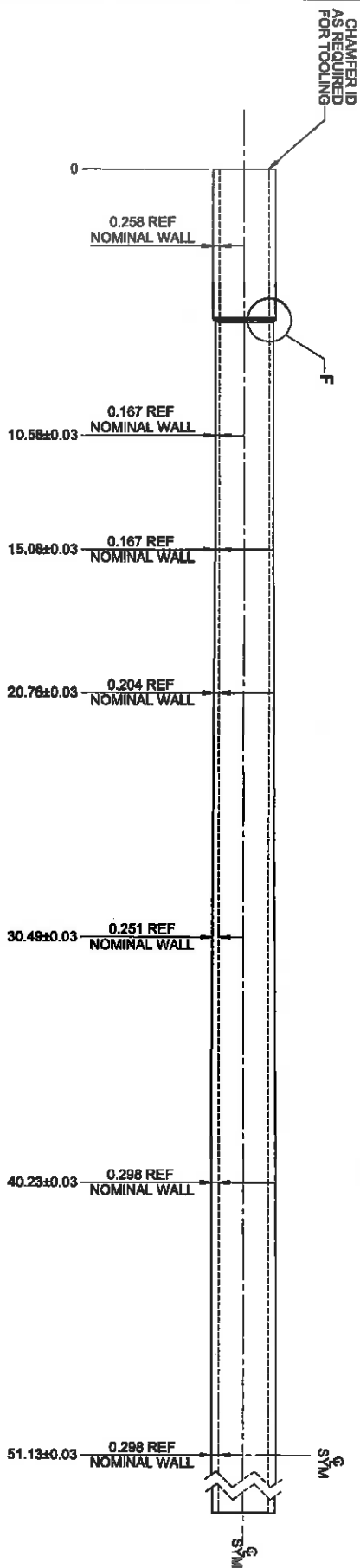
RELEASED  
2015-11-04  
APPROVED

| DESIGN     | AP       | AP | DART AEROSPACE LTD         |
|------------|----------|----|----------------------------|
| DRAWN      | AP       | AP | HAWKSBURY, ONTARIO, CANADA |
| CHECKED    | AJB      | AP | D119-796-141               |
| MFG. APPR. | JLM      | AP | REV. H                     |
| APPROVED   | WM       | AP | SHEET 8 OF 8               |
| DE APPR.   | DS       | AP | SCALE                      |
| DATE       | 15.10.13 | AP | NTS                        |

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DETAIL F  
SCALE 2X

D119-796-141 TRN CROSS TUBE, FWD  
SUPPLEMENTAL VIEW: NOMINAL WALL THICKNESS

RELEASED  
2015-11-04

APPROVED

|            |                             |                             |
|------------|-----------------------------|-----------------------------|
| DESIGN     | AP                          | DART AEROSPACE LTD          |
| DRAWN      | AP                          | HAWKESBURY, ONTARIO, CANADA |
| CHECKED    | AS                          |                             |
| MFG. APPR. | JLM                         |                             |
| APPROVED   | WM                          |                             |
| DE APPR.   | DS                          |                             |
| DATE       | 15.10.13                    |                             |
| TITLE      | XTUBE ASSY (AW119 MKII FWD) |                             |
| SCALE      | NTS                         |                             |

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Dart Aerospace Ltd.  
1270 Aberdeen Street  
Hawkesbury, ON K6A 1K7  
Tel: 613 632 9577  
Fax: 613 632 1053

## PURCHASE ORDER

Purchase Order ID PO34018

Purchase Order Date 10/21/2016

PO Print Date 10/21/2016

Page Number 2 of 3

Order From :  
SKYSERVICE  
6120 MIDFIELD ROAD  
MISSISSAUGA, ONTARIO L5P 1B1  
CANADA

VC-SKY001

Ship To : DART AEROSPACE LTD  
1270 ABERDEEN  
HAWKESBURY, ON K6A 1K7  
CANADA

Contact Name  
Vendor Phone 905-678-5636  
  
Ship To Contact  
Ship To Phone  
Ship Via: Delivered  
Ship Acct:

Buyer Chantal Lavoie  
Customer POID  
Customer Tax # 10127-2607  
Terms Net 30  
Currency CAD  
FOB FCA - (Free Carrier)

Line Total: \$0.00

|   |        |                                                                               |                   |              |                   |        |
|---|--------|-------------------------------------------------------------------------------|-------------------|--------------|-------------------|--------|
| 3 | 150978 | D119-796-141<br>CROSSTUBE                                                     | 10/21/2016        | 1.00         | \$0.00            | \$0.00 |
|   |        | LIQUID PENETRANT INSPECTION AS PER QSI 038 OR<br>LPI AS PER ASTM 1417 LEVEL 2 | Yes<br>10/21/2016 | OCT 2 1 2016 | DAS<br>13<br>9-89 |        |

Line Total: \$0.00

|   |        |                                                                               |                   |              |                   |        |
|---|--------|-------------------------------------------------------------------------------|-------------------|--------------|-------------------|--------|
| 4 | 150915 | D119-796-241<br>CROSSTUBE                                                     | 10/21/2016        | 1.00         | \$0.00            | \$0.00 |
|   |        | LIQUID PENETRANT INSPECTION AS PER QSI 038 OR<br>LPI AS PER ASTM 1417 LEVEL 2 | Yes<br>10/21/2016 | OCT 2 1 2016 | DAS<br>13<br>9-89 |        |

Line Total: \$0.00

|   |        |                                                                               |                   |              |                   |        |
|---|--------|-------------------------------------------------------------------------------|-------------------|--------------|-------------------|--------|
| 5 | 150914 | D119-796-241<br>CROSSTUBE                                                     | 10/21/2016        | 1.00         | \$0.00            | \$0.00 |
|   |        | LIQUID PENETRANT INSPECTION AS PER QSI 038 OR<br>LPI AS PER ASTM 1417 LEVEL 2 | Yes<br>10/21/2016 | OCT 2 1 2016 | DAS<br>13<br>9-89 |        |

Note:

10/21/2016





# skyservice Work Order Traveler

Sky Service F.B.O. Inc.

DOT APP 53-89 / EASA 145.7142 / BDA AMO 385

|                   |                               |               |                    |
|-------------------|-------------------------------|---------------|--------------------|
| WO #: MWO29836    | Customer: Dart Aerospace Ltd. | Dept: NDT YUL | Reference: PO34018 |
| Descr:            | PN:                           | S/N:          | Qty: 1             |
| Make:             | Model:                        | Reg:          | A/C S/N:           |
| TSN:              | CSN:                          | TSO:          |                    |
| Task: UNSCHEDULED |                               |               | Sequence: 1        |

## Work Required:

CARRY OUT NDT (LIQUID PENETRANT CRACK TEST) ON THE FOLLOWING FIVE (5) CROSSTUBES:

ID# D119-796-241 AFT CROSSTUBES

- 1- WORK ORDER ID 150598    2-WORK ORDER ID 150914  
3- WORK ORDER ID 150915

ID# D119-796-141 FWD CROSSTUBES

- 4- WORK ORDER ID 150977    5- WORK ORDER ID 150978

| Action Taken:                                                                                  |          |     |     |       | Date:          | Initial/Stamp: |
|------------------------------------------------------------------------------------------------|----------|-----|-----|-------|----------------|----------------|
| LIQUID PENETRANT INSPECTION CARRIED OUT ON ITEMS LISTED ABOVE (ITEMS 1-5) AS PER ASTM1417 M-13 |          |     |     |       | 2/ OCT<br>2016 |                |
| NO CRACK FOUND                                                                                 |          |     |     |       |                |                |
| PEN.(ZL-56, MPO13600), DEV.(SKD-S2, MPO11715), CLEANER(SKC-S, MPO13923)                        |          |     |     |       |                |                |
| BLACK LIGHT USED: SER# M-20188                                                                 |          |     |     |       |                |                |
| DAS 9 9-89                                                                                     |          |     |     |       |                |                |
| DAS 13 9-89                                                                                    |          |     |     |       |                |                |
| OCT 21 2016                                                                                    |          |     |     |       |                |                |
| Description                                                                                    | Location | P/N | Qty | Batch | S/N Off        | S/N On         |
|                                                                                                |          |     |     |       |                |                |
|                                                                                                |          |     |     |       |                |                |
|                                                                                                |          |     |     |       |                |                |
|                                                                                                |          |     |     |       |                |                |
|                                                                                                |          |     |     |       |                |                |
|                                                                                                |          |     |     |       |                |                |

I certified that the maintenance described above has been performed in accordance with the applicable standard of airworthiness.

|                       |                   |                         |
|-----------------------|-------------------|-------------------------|
| Signature:            | ACA/SCA Stamp<br> | Date:<br>2/ OCT<br>2016 |
| Name: CHRISTIAN BRIEN |                   |                         |

